US009111008B2

(12) **United States Patent**
Yano et al.

(10) **Patent No.: US 9,111,008 B2**
(45) **Date of Patent: *Aug. 18, 2015**

(54) **DOCUMENT INFORMATION MANAGEMENT SYSTEM**

(71) Applicant: **RICOH COMPANY, LTD.**, Ohta-ku (JP)

(72) Inventors: **Takashi Yano**, Tokyo (JP); **Yasuhiro Tabata**, Kanagawa (JP); **Hisashi Ishijima**, Kanagawa (JP)

(73) Assignee: **Ricoh Company, Ltd.**, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/024,093**

(22) Filed: **Sep. 11, 2013**

(65) **Prior Publication Data**

US 2014/0052709 A1 Feb. 20, 2014

Related U.S. Application Data

(63) Continuation of application No. 11/400,229, filed on Apr. 10, 2006, now Pat. No. 8,554,786, which is a continuation of application No. 10/668,973, filed on Sep. 24, 2003, now abandoned, which is a continuation

(Continued)

(30) **Foreign Application Priority Data**

May 8, 1998	(JP)	....	10-126515
Aug. 18, 1998	(JP)	....	10-231845

(51) **Int. Cl.**
G06F 17/30 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 17/30905*** (2013.01); ***G06F 17/30637*** (2013.01); ***G06F 17/30864*** (2013.01); *Y10S 707/99933* (2013.01); *Y10S 707/99945* (2013.01); *Y10S 715/968* (2013.01)

(58) **Field of Classification Search**
CPC G06F 17/30023; G06F 17/30389; G06F 17/30905; G06F 17/30637; G06F 17/30864
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,490,217 A 2/1996 Wang et al.
5,535,063 A 7/1996 Lamming

(Continued)

FOREIGN PATENT DOCUMENTS

JP 5-128157 5/1993
JP 5-189488 7/1993

(Continued)

OTHER PUBLICATIONS

Google Toolbar (http://toolbar.google.com/button help.html p. 1-4.

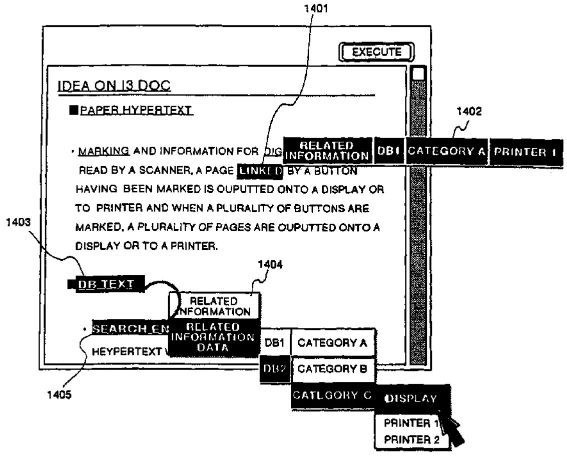
(Continued)

Primary Examiner — Sangwoo Ahn
(74) *Attorney, Agent, or Firm* — Oblon, McClelland, Maier & Neustadt, L.L.P.

(57) **ABSTRACT**

A document information management system in which a search-engine-compatible interface unit makes a word in a document displayed on the screen to be specified, transfers the specified word to a search engine as a keyword to be used in the search engine, receives a search result from the search engine, and displays the search result on the screen, while a browser-compatible interface unit performs a search (a keyword search and/or global search) by using the keyword transferred from a browser and transfers a search result to the browser.

5 Claims, 18 Drawing Sheets



· MARKING AND INFORMATION FOR DIG READ BY A SCANNER, A PAGE LINKED BY A BUTTON HAVING BEEN MARKED IS OUPUTTED ONTO A DISPLAY OR TO PRINTER AND WHEN A PLURALITY OF BUTTONS ARE MARKED, A PLURALITY OF PAGES ARE OUPUTTED ONTO A DISPLAY OR TO A PRINTER.

Related U.S. Application Data

of application No. 10/126,588, filed on Apr. 22, 2002, now Pat. No. 6,658,408, which is a continuation of application No. 09/305,473, filed on May 6, 1999, now Pat. No. 6,381,593.

(56) References Cited

U.S. PATENT DOCUMENTS

5,555,408	A		9/1996	Fujisawa et al.	
5,619,410	A		4/1997	Emori et al.	
5,640,193	A		6/1997	Wellner	
5,642,502	A		6/1997	Driscoll	
5,657,390	A		8/1997	Elgamal et al.	
5,748,805	A		5/1998	Withgott et al.	
5,760,382	A		6/1998	Li et al.	
5,778,367	A		7/1998	Wesinger, Jr. et al.	
5,794,235	A	*	8/1998	Chess	1/1
5,794,236	A		8/1998	Mehrle	
5,805,740	A		9/1998	Takagi et al.	
5,812,123	A		9/1998	Rowe et al.	
5,847,708	A		12/1998	Wolff	
5,873,735	A		2/1999	Yamada et al.	
5,895,470	A		4/1999	Pirolli et al.	
5,905,862	A		5/1999	Hoekstra	
5,926,808	A		7/1999	Evans et al.	
5,963,965	A		10/1999	Vogel	
5,974,202	A		10/1999	Wang et al.	
5,977,972	A		11/1999	Bates et al.	
5,982,370	A	*	11/1999	Kamper	715/760
5,987,454	A		11/1999	Hobbs	
5,991,756	A		11/1999	Wu	
6,012,053	A		1/2000	Pant et al.	
6,018,345	A		1/2000	Berstis	
6,026,409	A		2/2000	Blumenthal	
6,035,308	A		3/2000	Yano et al.	
6,041,326	A		3/2000	Amro et al.	
6,041,335	A		3/2000	Merritt et al.	
6,078,914	A	*	6/2000	Redfern	1/1
6,081,261	A		6/2000	Wolff et al.	
6,092,074	A		7/2000	Rodkin et al.	
6,094,649	A		7/2000	Bowen et al.	
6,122,647	A		9/2000	Horowitz et al.	
6,356,923	B1		3/2002	Yano et al.	
6,381,593	B1		4/2002	Yano et al.	
6,446,096	B1		9/2002	Holland et al.	
6,601,057	B1		7/2003	Underwood et al.	
2002/0036694	A1		3/2002	Merrill	

FOREIGN PATENT DOCUMENTS

JP	9-44525	2/1997
JP	9-91301	4/1997

OTHER PUBLICATIONS

Hotclick function of Opera for Windows (http://www.opera.com/support/tutorials/opera/using/coolfeatures/); pp. 1-2.

Babylon-Pro, Printed Nov. 14, 2002, Babylon Ltd. pp. 1-5, (http://www.babylon.com/display.php?id+14&tree=3&1evel+2).

Ploger et al. “WWW Based Structuring of Codesigns”, System synthesis, 1995, proceedings of the eighth international symposium, Sep. 13-15, 1995, pp. 138-143.

T. Darnell, Health Management Technology, vol. 18, No. 2, 5 pages, “Device As Dynamic As the People Who Use Them”, Feb. 1997.

J.G. Spooner, PC Week, vol. 14, No. 42, 2 pages, “Penright Boosts OS Support”, Oct. 6, 1997.

Kathy Berkemeyer, et al., DDC Quick Guide for Corel WordPerfect 7 for Windows 95, Copyright 1996, pp. 69-70 and 187-188.

Gerald Joyce, et al., Microsoft Word 97 At a Glance, Copyright 1997, pp. 18, 19, 280-286.

C. Apte, et al., ACM Transactions on Information System, vol. 12, No. 3, pp. 233-251 “Automated Learning of Decision Rules for Text Categorization”, Jul. 1994.

C. Chekuri, et al., 6th WWW Conference, pp. 1-11, “Web Search Using Automatic Classification”, 1996.

* cited by examiner

FIG.1

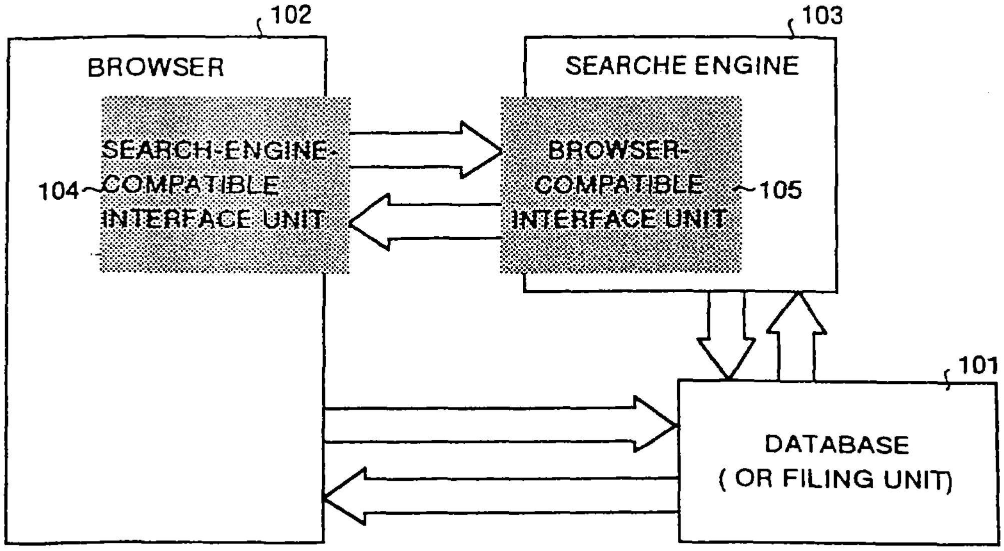

102
BROWSER
SEARCH-ENGINE-COMPATIBLE INTERFACE UNIT
104
103
SEARCHE ENGINE
BROWSER-COMPATIBLE INTERFACE UNIT
105
101
DATABASE
(OR FILING UNIT)

FIG.2

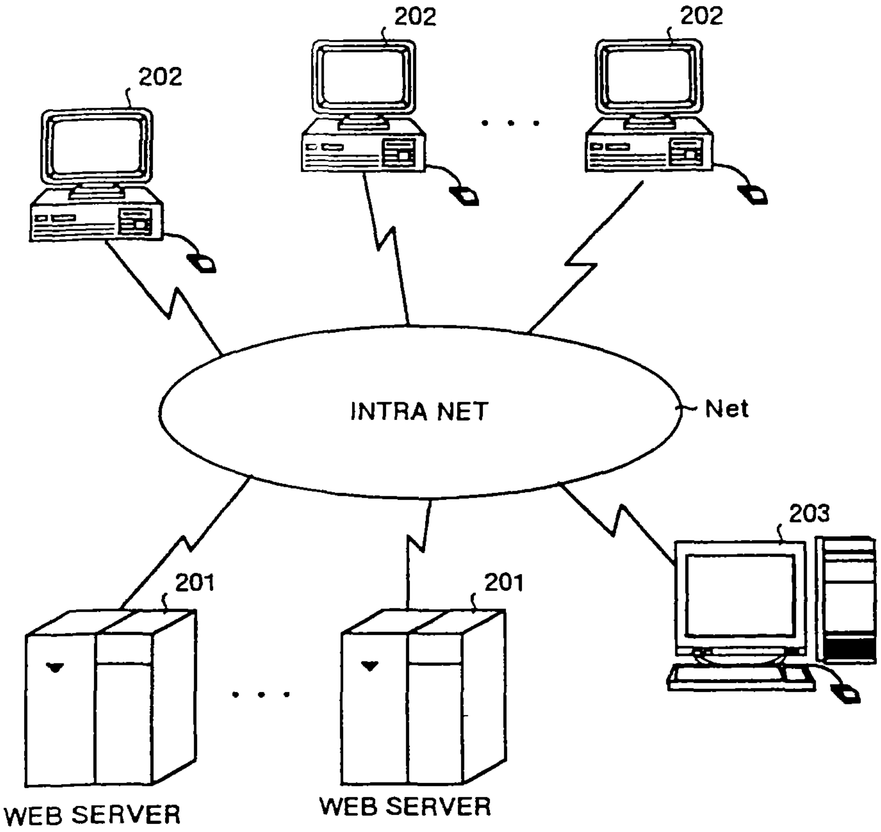


FIG.3

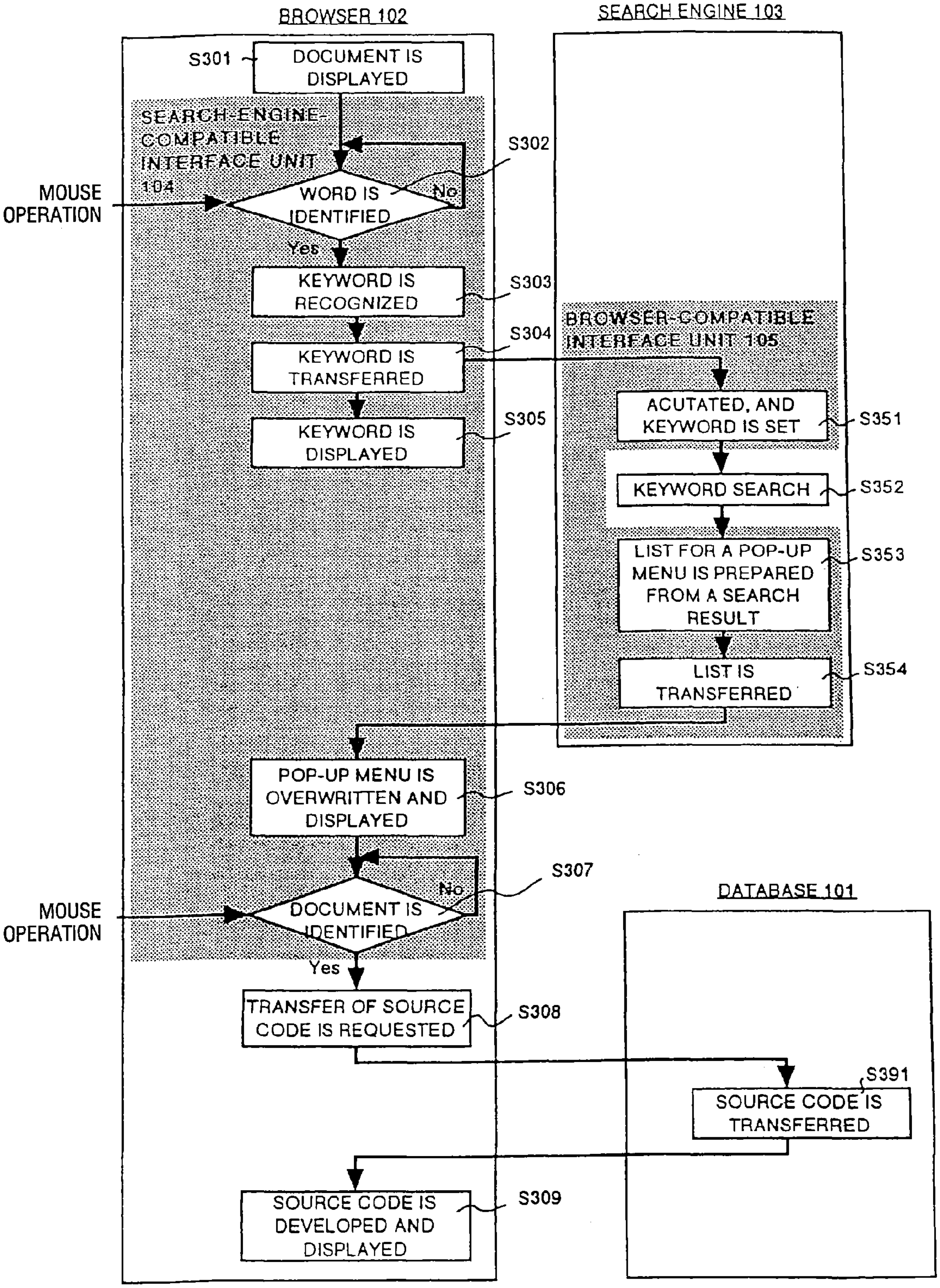
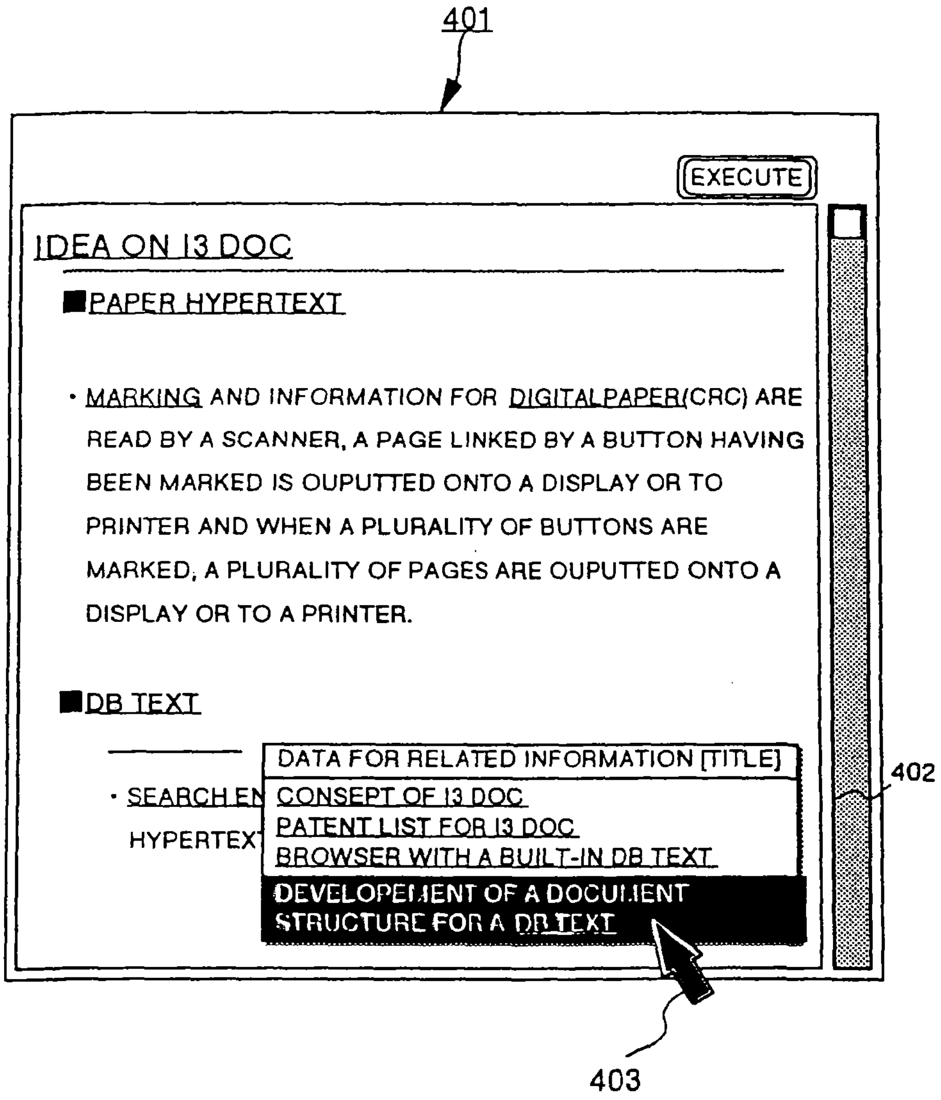

BROWSER 102
SEARCH ENGINE 103
S301
DOCUMENT IS DISPLAYED
SEARCH-ENGINE-COMPATIBLE INTERFACE UNIT 104
S302
MOUSE OPERATION
WORD IS IDENTIFIED
No
Yes
KEYWORD IS RECOGNIZED
S303
KEYWORD IS TRANSFERRED
S304
KEYWORD IS DISPLAYED
S305
BROWSER-COMPATIBLE INTERFACE UNIT 105
ACUTATED, AND KEYWORD IS SET
S351
KEYWORD SEARCH
S352
LIST FOR A POP-UP MENU IS PREPARED FROM A SEARCH RESULT
S353
LIST IS TRANSFERRED
S354
POP-UP MENU IS OVERWRITTEN AND DISPLAYED
S306
S307
MOUSE OPERATION
DOCUMENT IS IDENTIFIED
No
Yes
DATABASE 101
TRANSFER OF SOURCE CODE IS REQUESTED
S308
S391
SOURCE CODE IS TRANSFERRED
SOURCE CODE IS DEVELOPED AND DISPLAYED
S309

FIG.4


401
EXECUTE
DATA FOR RELATED INFORMATION [TITLE]
CONSEPT OF I3 DOC
PATENT LIST FOR I3 DOC
BROWSER WITH A BUILT-IN DB TEXT
DEVELOPEMENT OF A DOCUMENT STRUCTURE FOR A DB TEXT
402
403

IDEA ON I3 DOC

■PAPER HYPERTEXT

- MARKING AND INFORMATION FOR DIGITALPAPER(CRC) ARE READ BY A SCANNER, A PAGE LINKED BY A BUTTON HAVING BEEN MARKED IS OUPUTTED ONTO A DISPLAY OR TO PRINTER AND WHEN A PLURALITY OF BUTTONS ARE MARKED, A PLURALITY OF PAGES ARE OUPUTTED ONTO A DISPLAY OR TO A PRINTER.

■DB TEXT

- SEARCH EN
HYPERTEX

FIG.5

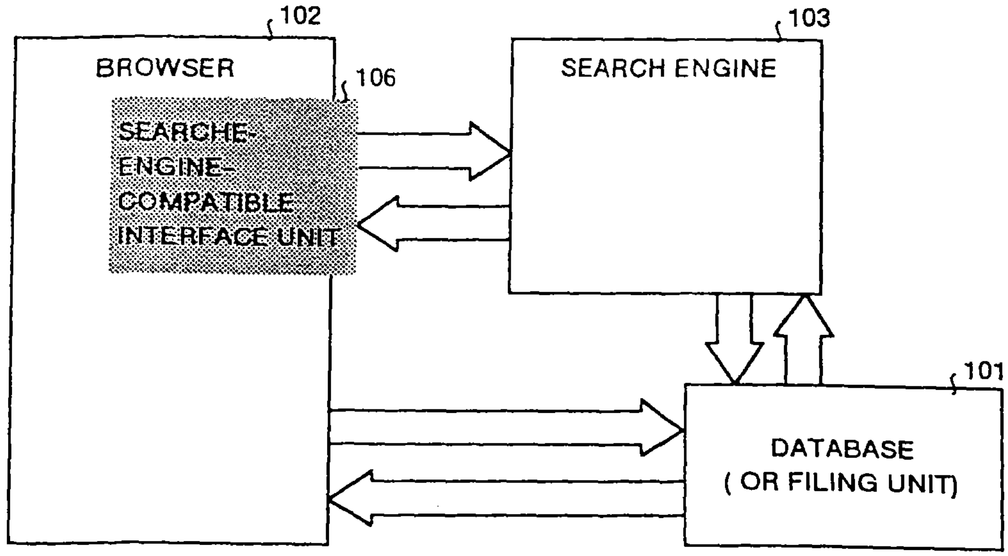

102
BROWSER
106
SEARCHE-
ENGINE-
COMPATIBLE
INTERFACE UNIT
103
SEARCH ENGINE
101
DATABASE
(OR FILING UNIT)

FIG.6

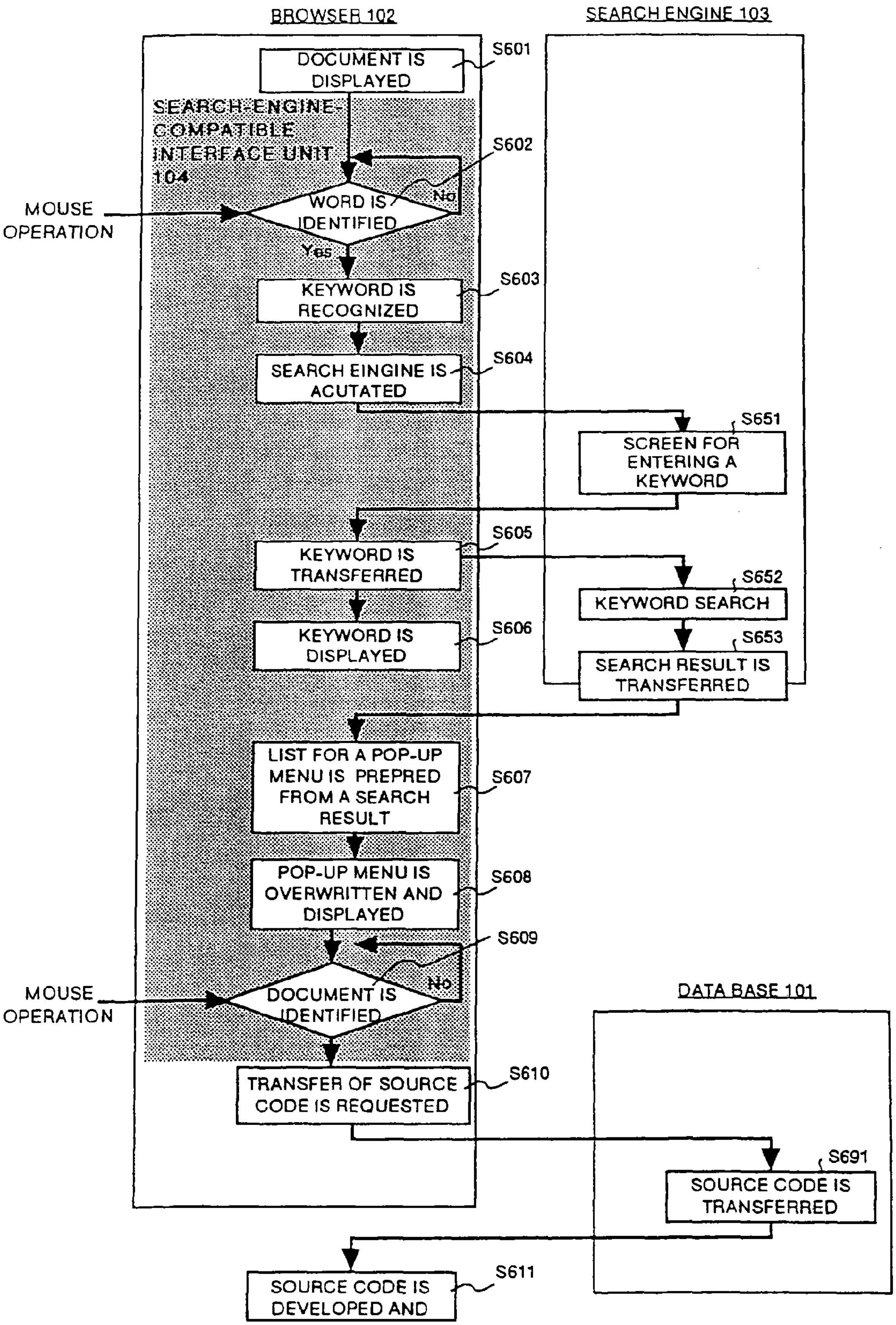

BROWSER 102
SEARCH ENGINE 103
DOCUMENT IS DISPLAYED
S601
SEARCH-ENGINE-COMPATIBLE INTERFACE UNIT 104
S602
MOUSE OPERATION
WORD IS IDENTIFIED
No
Yes
KEYWORD IS RECOGNIZED
S603
SEARCH EINGINE IS ACUTATED
S604
S651
SCREEN FOR ENTERING A KEYWORD
KEYWORD IS TRANSFERRED
S605
S652
KEYWORD SEARCH
KEYWORD IS DISPLAYED
S606
S653
SEARCH RESULT IS TRANSFERRED
LIST FOR A POP-UP MENU IS PREPRED FROM A SEARCH RESULT
S607
POP-UP MENU IS OVERWRITTEN AND DISPLAYED
S608
S609
MOUSE OPERATION
DOCUMENT IS IDENTIFIED
No
DATA BASE 101
TRANSFER OF SOURCE CODE IS REQUESTED
S610
S691
SOURCE CODE IS TRANSFERRED
SOURCE CODE IS DEVELOPED AND
S611

FIG.7

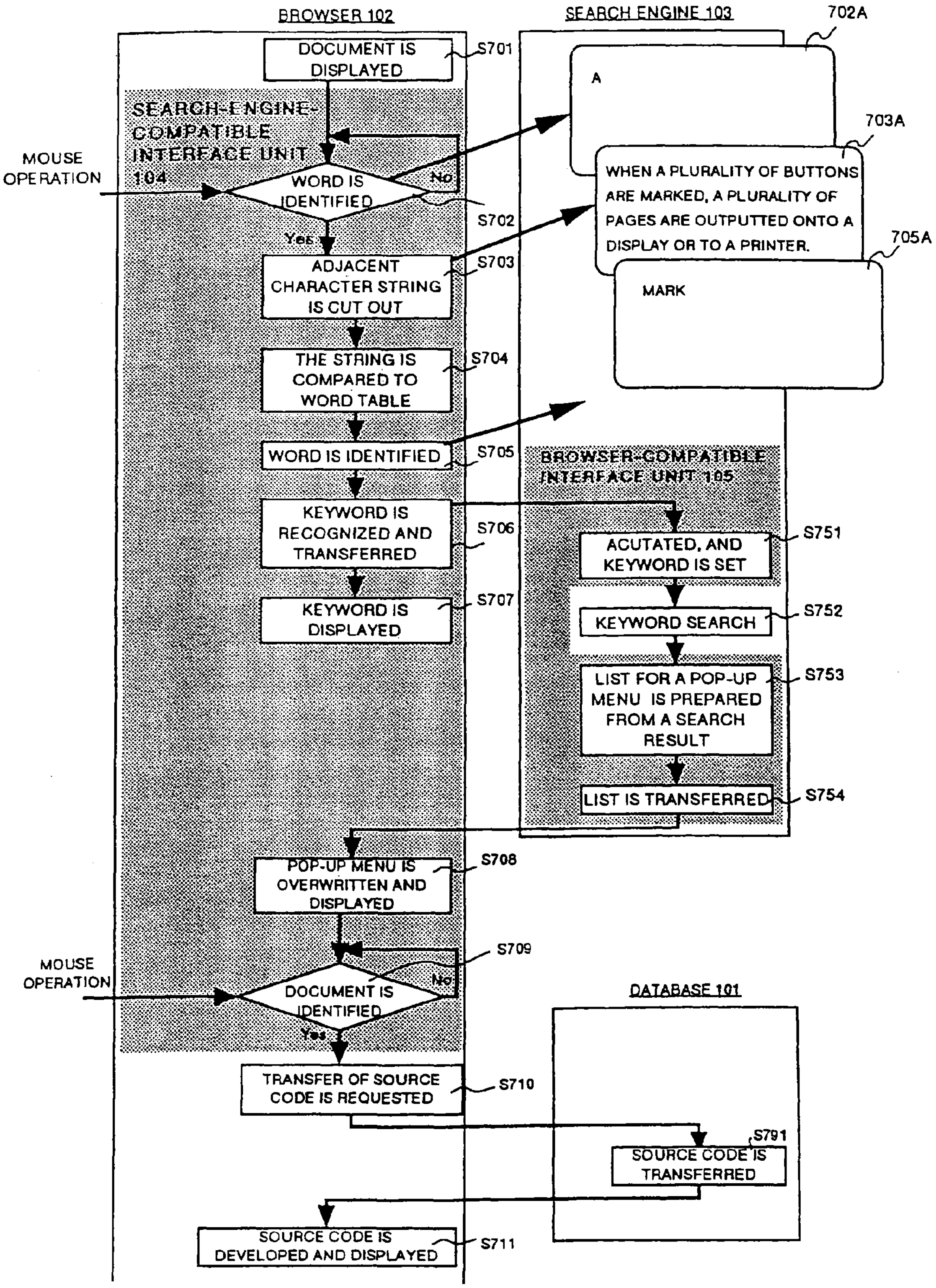
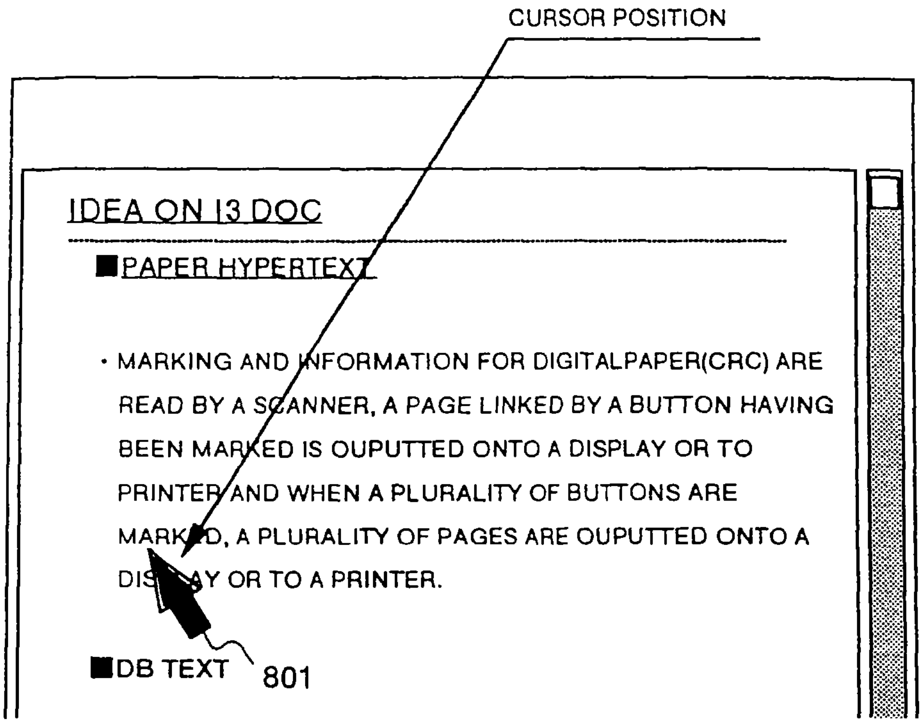

BROWSER 102
SEARCH ENGINE 103
702A
S701
DOCUMENT IS DISPLAYED
A
SEARCH-ENGINE-COMPATIBLE INTERFACE UNIT 104
703A
MOUSE OPERATION
WORD IS IDENTIFIED
No
WHEN A PLURALITY OF BUTTONS ARE MARKED, A PLURALITY OF PAGES ARE OUTPUTTED ONTO A DISPLAY OR TO A PRINTER.
S702
Yes
705A
ADJACENT CHARACTER STRING IS CUT OUT
S703
MARK
THE STRING IS COMPARED TO WORD TABLE
S704
WORD IS IDENTIFIED
S705
BROWSER-COMPATIBLE INTERFACE UNIT 105
KEYWORD IS RECOGNIZED AND TRANSFERRED
S706
ACUTATED, AND KEYWORD IS SET
S751
KEYWORD IS DISPLAYED
S707
KEYWORD SEARCH
S752
LIST FOR A POP-UP MENU IS PREPARED FROM A SEARCH RESULT
S753
LIST IS TRANSFERRED
S754
POP-UP MENU IS OVERWRITTEN AND DISPLAYED
S708
S709
MOUSE OPERATION
DOCUMENT IS IDENTIFIED
No
Yes
DATABASE 101
TRANSFER OF SOURCE CODE IS REQUESTED
S710
S791
SOURCE CODE IS TRANSFERRED
SOURCE CODE IS DEVELOPED AND DISPLAYED
S711

FIG.8



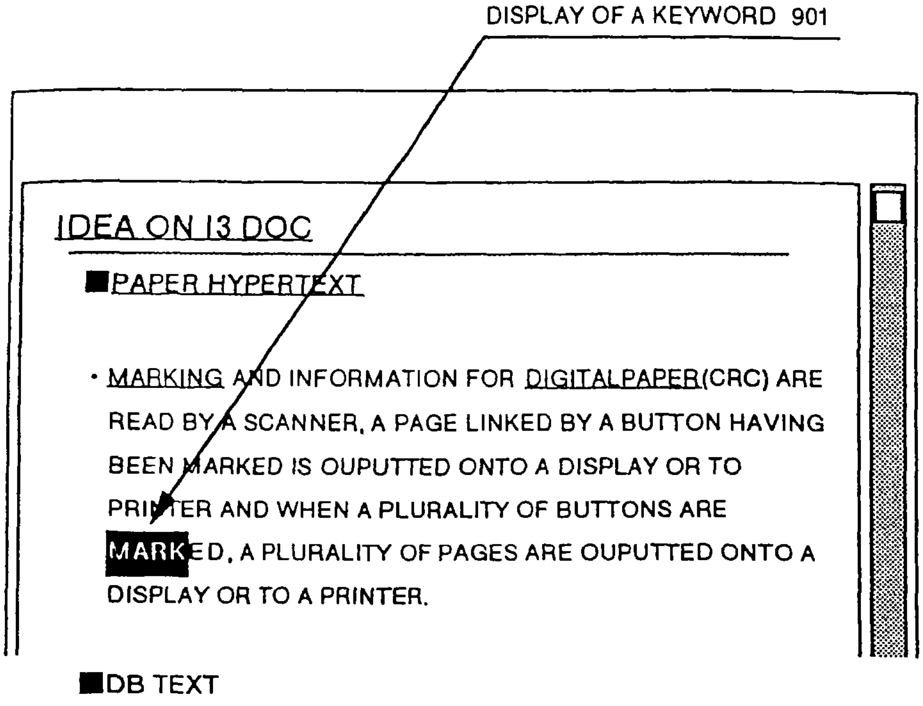
IDEA ON I3 DOC

■PAPER HYPERTEXT

- MARKING AND INFORMATION FOR DIGITALPAPER(CRC) ARE READ BY A SCANNER, A PAGE LINKED BY A BUTTON HAVING BEEN MARKED IS OUPUTTED ONTO A DISPLAY OR TO PRINTER AND WHEN A PLURALITY OF BUTTONS ARE MARKED, A PLURALITY OF PAGES ARE OUPUTTED ONTO A DISPLAY OR TO A PRINTER.

■DB TEXT

FIG.9



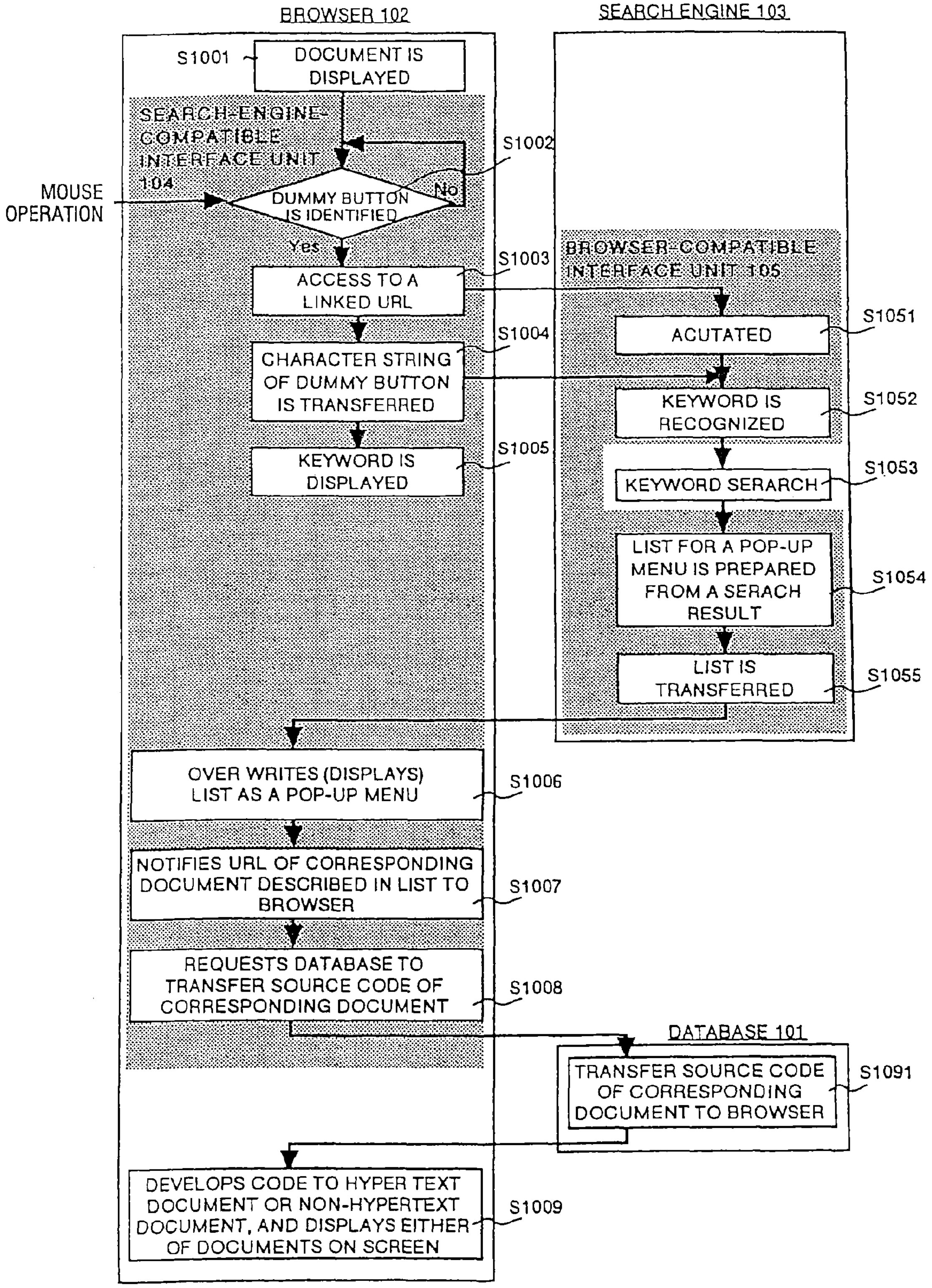
IDEA ON I3 DOC

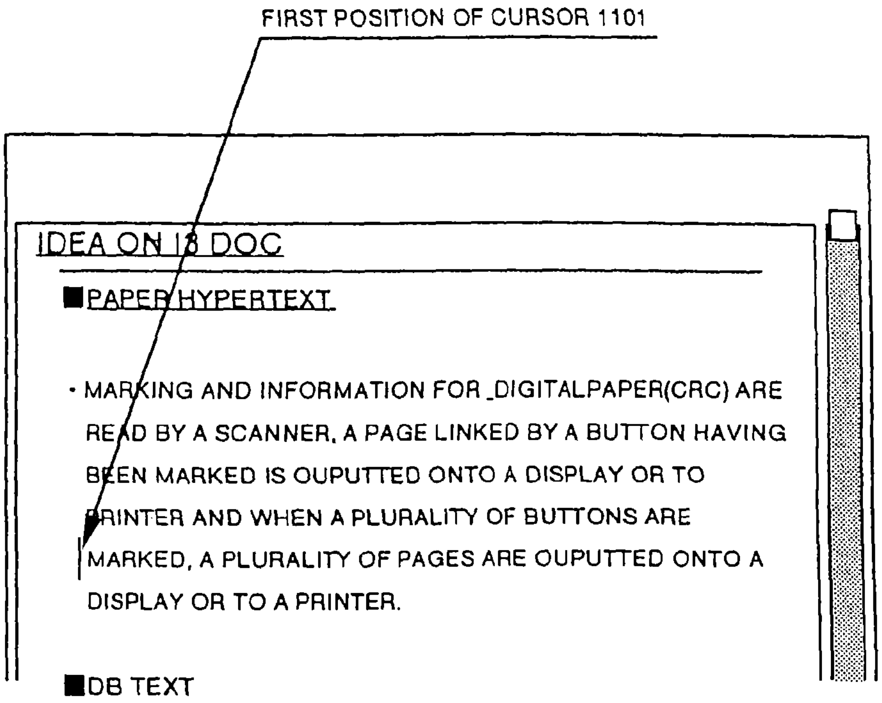
■PAPER HYPERTEXT

- MARKING AND INFORMATION FOR DIGITALPAPER(CRC) ARE READ BY A SCANNER, A PAGE LINKED BY A BUTTON HAVING BEEN MARKED IS OUPUTTED ONTO A DISPLAY OR TO PRINTER AND WHEN A PLURALITY OF BUTTONS ARE MARKED, A PLURALITY OF PAGES ARE OUPUTTED ONTO A DISPLAY OR TO A PRINTER.

■DB TEXT

FIG.10


BROWSER 102
SEARCH ENGINE 103
S1001
DOCUMENT IS DISPLAYED
SEARCH-ENGINE-COMPATIBLE INTERFACE UNIT 104
S1002
MOUSE OPERATION
DUMMY BUTTON IS IDENTIFIED
No
Yes
S1003
ACCESS TO A LINKED URL
S1004
CHARACTER STRING OF DUMMY BUTTON IS TRANSFERRED
S1005
KEYWORD IS DISPLAYED
BROWSER-COMPATIBLE INTERFACE UNIT 105
S1051
ACUTATED
S1052
KEYWORD IS RECOGNIZED
S1053
KEYWORD SERARCH
S1054
LIST FOR A POP-UP MENU IS PREPARED FROM A SERACH RESULT
S1055
LIST IS TRANSFERRED
S1006
OVER WRITES (DISPLAYS) LIST AS A POP-UP MENU
S1007
NOTIFIES URL OF CORRESPONDING DOCUMENT DESCRIBED IN LIST TO BROWSER
S1008
REQUESTS DATABASE TO TRANSFER SOURCE CODE OF CORRESPONDING DOCUMENT
DATABASE 101
S1091
TRANSFER SOURCE CODE OF CORRESPONDING DOCUMENT TO BROWSER
S1009
DEVELOPS CODE TO HYPER TEXT DOCUMENT OR NON-HYPERTEXT DOCUMENT, AND DISPLAYS EITHER OF DOCUMENTS ON SCREEN



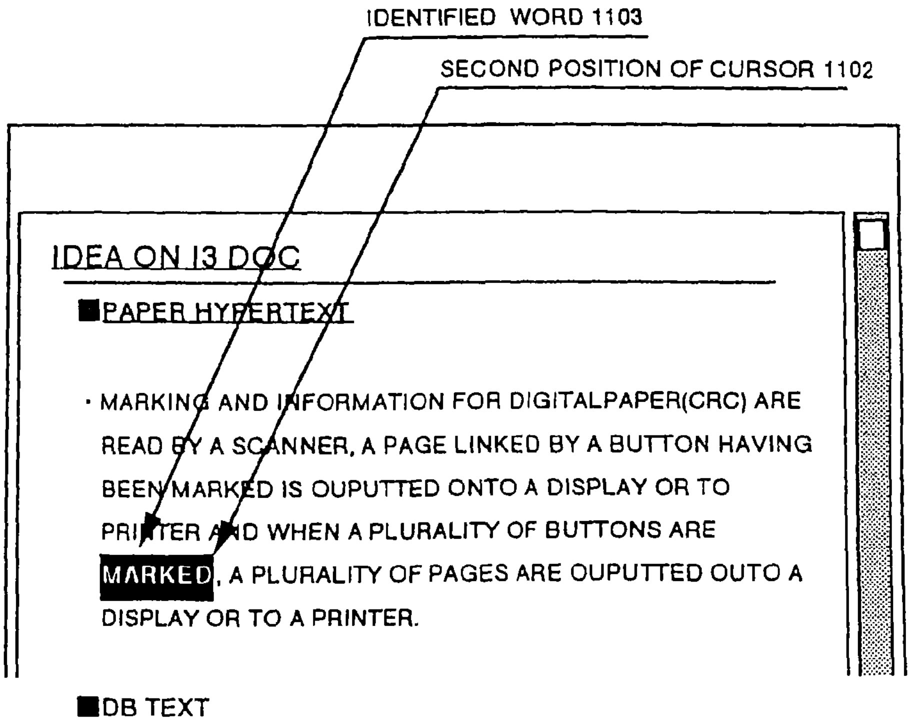
IDEA ON I3 DOC

■PAPER HYPERTEXT

• MARKING AND INFORMATION FOR _DIGITALPAPER(CRC) ARE READ BY A SCANNER. A PAGE LINKED BY A BUTTON HAVING BEEN MARKED IS OUPUTTED ONTO A DISPLAY OR TO PRINTER AND WHEN A PLURALITY OF BUTTONS ARE MARKED, A PLURALITY OF PAGES ARE OUPUTTED ONTO A DISPLAY OR TO A PRINTER.

■DB TEXT

FIG.11A



IDEA ON I3 DOC

■PAPER HYPERTEXT

• MARKING AND INFORMATION FOR DIGITALPAPER(CRC) ARE READ BY A SCANNER. A PAGE LINKED BY A BUTTON HAVING BEEN MARKED IS OUPUTTED ONTO A DISPLAY OR TO PRINTER AND WHEN A PLURALITY OF BUTTONS ARE MARKED, A PLURALITY OF PAGES ARE OUPUTTED OUTO A DISPLAY OR TO A PRINTER.

■DB TEXT

FIG.11B

FIG.12

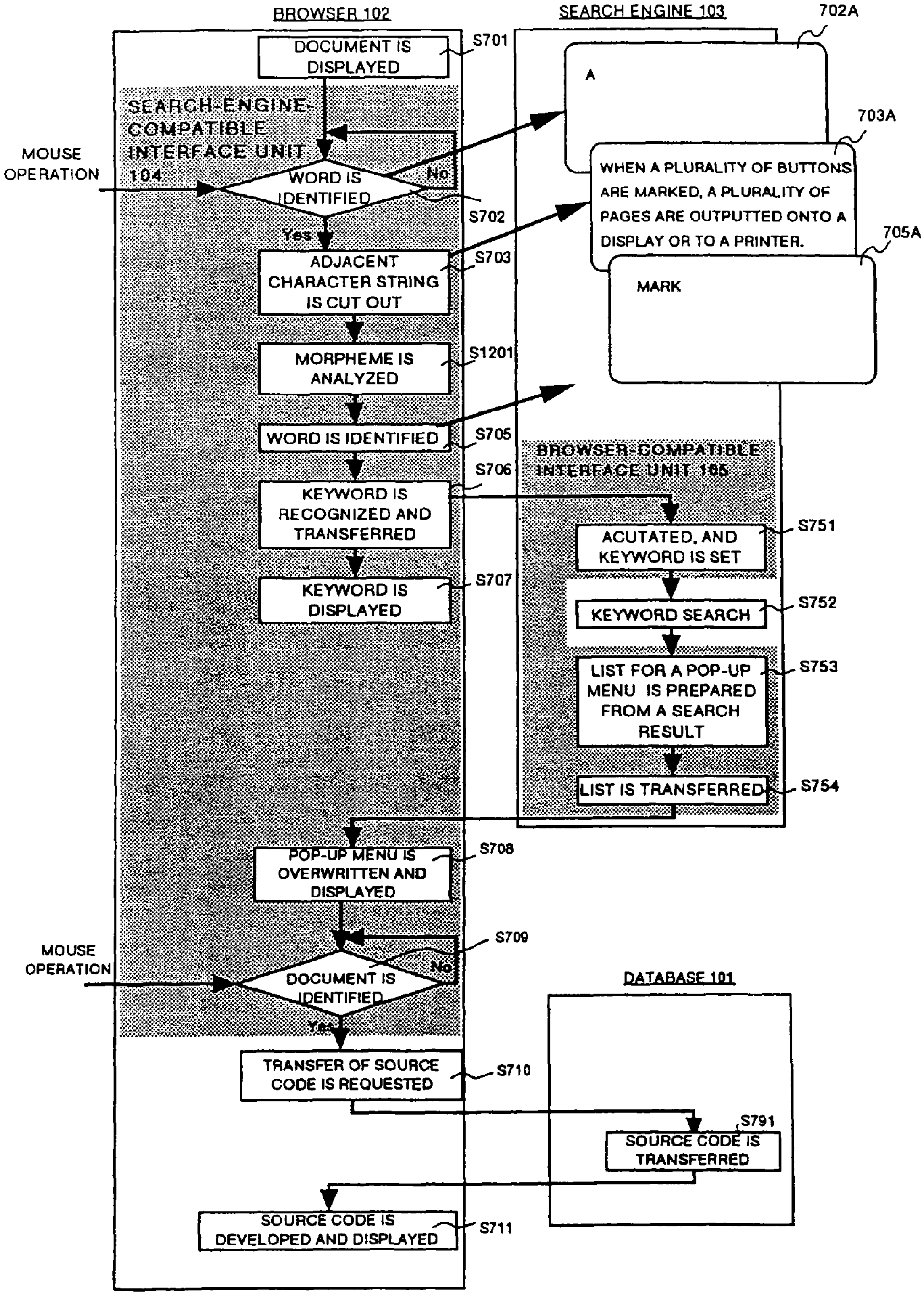

BROWSER 102
SEARCH ENGINE 103
702A
DOCUMENT IS DISPLAYED
S701
A
SEARCH-ENGINE-COMPATIBLE INTERFACE UNIT 104
703A
MOUSE OPERATION
WORD IS IDENTIFIED
No
WHEN A PLURALITY OF BUTTONS ARE MARKED, A PLURALITY OF PAGES ARE OUTPUTTED ONTO A DISPLAY OR TO A PRINTER.
S702
Yes
705A
ADJACENT CHARACTER STRING IS CUT OUT
S703
MARK
MORPHEME IS ANALYZED
S1201
WORD IS IDENTIFIED
S705
BROWSER-COMPATIBLE INTERFACE UNIT 105
S706
KEYWORD IS RECOGNIZED AND TRANSFERRED
ACUTATED, AND KEYWORD IS SET
S751
KEYWORD IS DISPLAYED
S707
KEYWORD SEARCH
S752
LIST FOR A POP-UP MENU IS PREPARED FROM A SEARCH RESULT
S753
LIST IS TRANSFERRED
S754
POP-UP MENU IS OVERWRITTEN AND DISPLAYED
S708
S709
MOUSE OPERATION
No
DOCUMENT IS IDENTIFIED
DATABASE 101
Yes
TRANSFER OF SOURCE CODE IS REQUESTED
S710
S791
SOURCE CODE IS TRANSFERRED
SOURCE CODE IS DEVELOPED AND DISPLAYED
S711

FIG.13

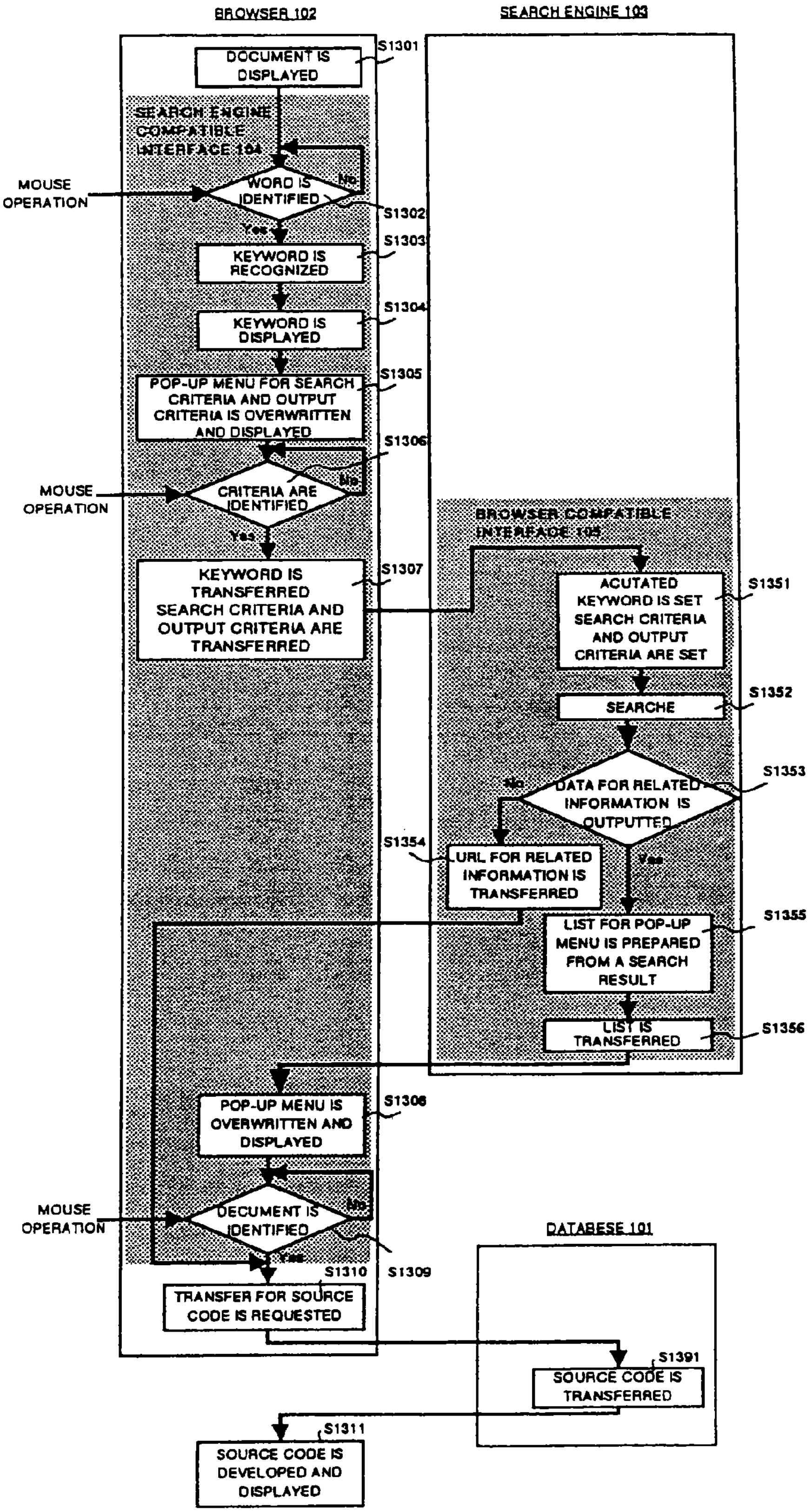
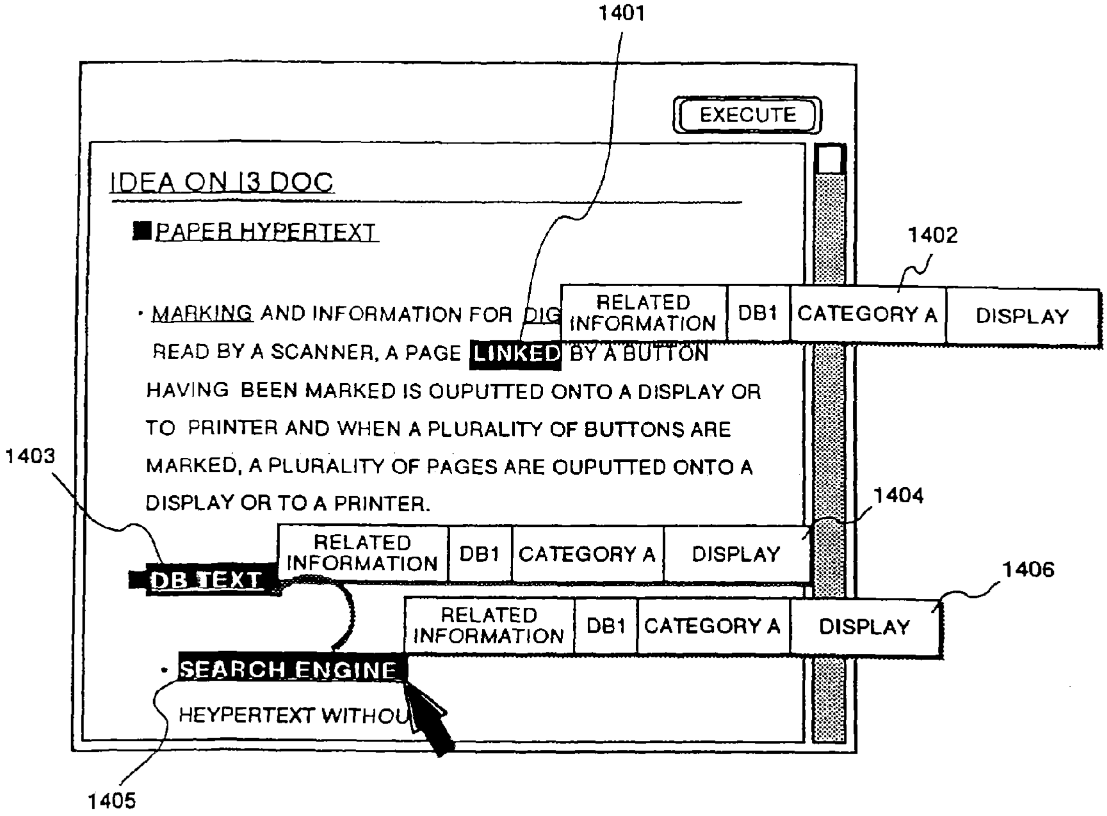

BROWSER 102
SEARCH ENGINE 103
DOCUMENT IS DISPLAYED
S1301
SEARCH ENGINE COMPATIBLE INTERFACE 104
MOUSE OPERATION
WORD IS IDENTIFIED
No
Yes
S1302
KEYWORD IS RECOGNIZED
S1303
KEYWORD IS DISPLAYED
S1304
POP-UP MENU FOR SEARCH CRITERIA AND OUTPUT CRITERIA IS OVERWRITTEN AND DISPLAYED
S1305
S1306
MOUSE OPERATION
CRITERIA ARE IDENTIFIED
No
Yes
KEYWORD IS TRANSFERRED SEARCH CRITERIA AND OUTPUT CRITERIA ARE TRANSFERRED
S1307
BROWSER COMPATIBLE INTERFACE 105
ACUTATED KEYWORD IS SET SEARCH CRITERIA AND OUTPUT CRITERIA ARE SET
S1351
SEARCHE
S1352
DATA FOR RELATED INFORMATION IS OUTPUTTED
S1353
No
Yes
S1354
URL FOR RELATED INFORMATION IS TRANSFERRED
LIST FOR POP-UP MENU IS PREPARED FROM A SEARCH RESULT
S1355
LIST IS TRANSFERRED
S1356
POP-UP MENU IS OVERWRITTEN AND DISPLAYED
S1308
MOUSE OPERATION
DECUMENT IS IDENTIFIED
No
Yes
S1309
S1310
TRANSFER FOR SOURCE CODE IS REQUESTED
DATABESE 101
S1391
SOURCE CODE IS TRANSFERRED
S1311
SOURCE CODE IS DEVELOPED AND DISPLAYED

FIG.14



IDEA ON I3 DOC

■PAPER HYPERTEXT

· MARKING AND INFORMATION FOR DIG

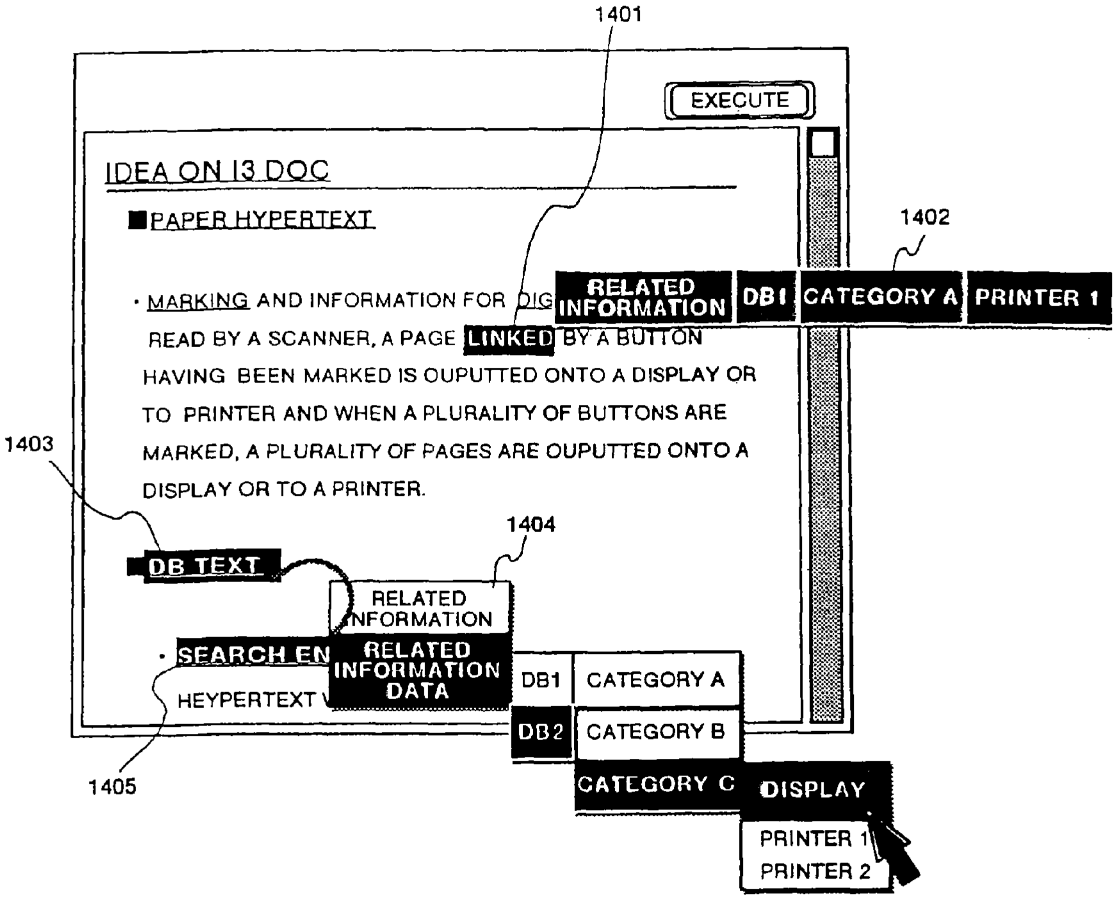
READ BY A SCANNER, A PAGE LINKED BY A BUTTON HAVING BEEN MARKED IS OUPUTTED ONTO A DISPLAY OR TO PRINTER AND WHEN A PLURALITY OF BUTTONS ARE MARKED, A PLURALITY OF PAGES ARE OUPUTTED ONTO A DISPLAY OR TO A PRINTER.

DB TEXT

· SEARCH ENGINE

HEYPERTEXT WITHOU

FIG.15



IDEA ON I3 DOC

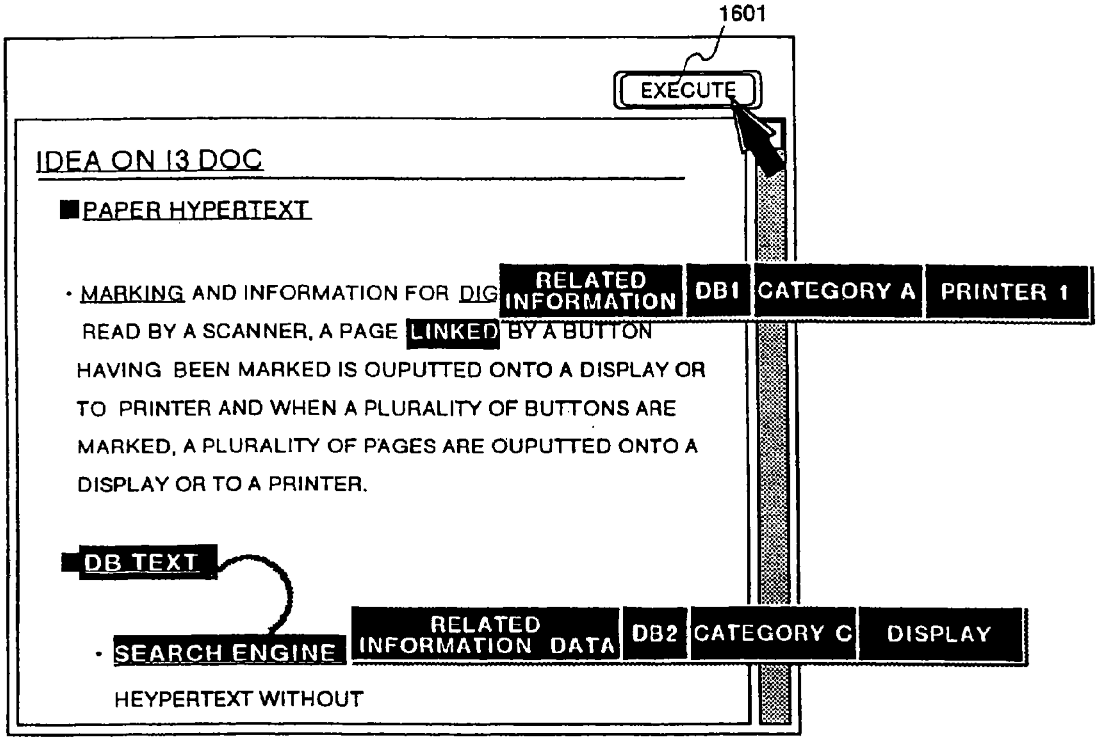
■PAPER HYPERTEXT

· MARKING AND INFORMATION FOR DIG READ BY A SCANNER, A PAGE LINKED BY A BUTTON HAVING BEEN MARKED IS OUPUTTED ONTO A DISPLAY OR TO PRINTER AND WHEN A PLURALITY OF BUTTONS ARE MARKED, A PLURALITY OF PAGES ARE OUPUTTED ONTO A DISPLAY OR TO A PRINTER.

■DB TEXT

· SEARCH EN HEYPERTEXT

FIG.16



IDEA ON I3 DOC

■PAPER HYPERTEXT

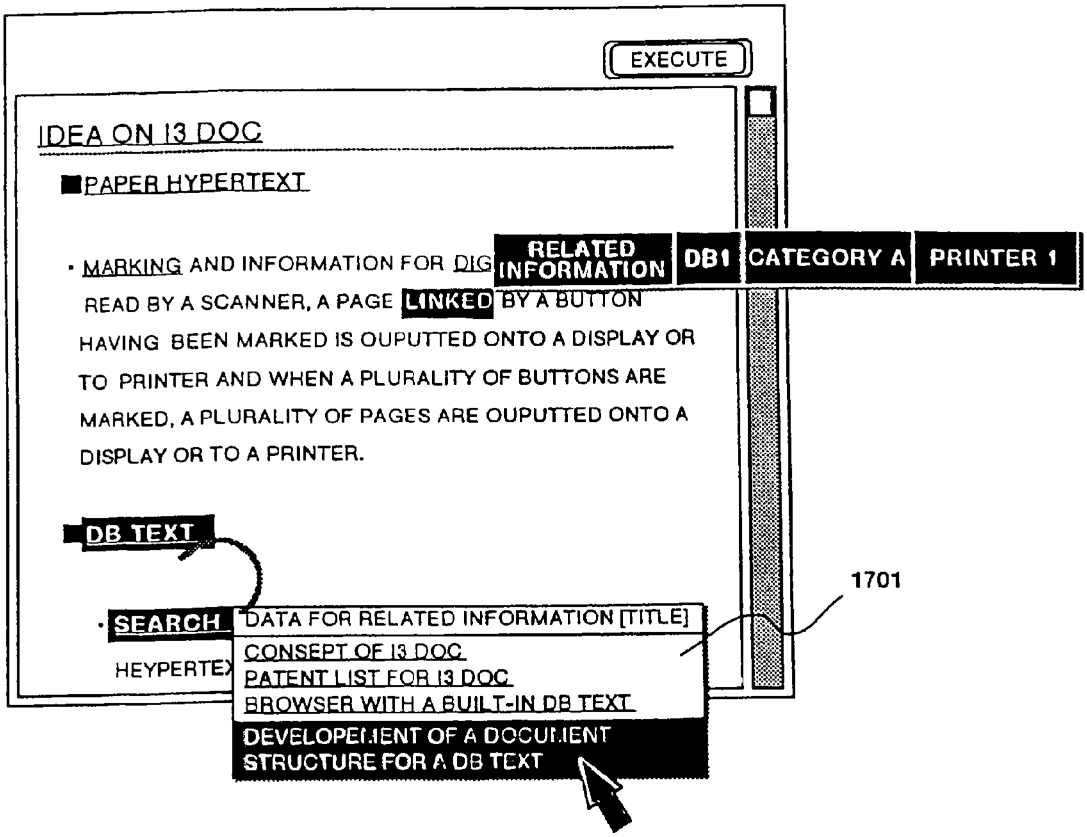
· MARKING AND INFORMATION FOR DIG

READ BY A SCANNER. A PAGE LINKED BY A BUTTON HAVING BEEN MARKED IS OUPUTTED ONTO A DISPLAY OR TO PRINTER AND WHEN A PLURALITY OF BUTTONS ARE MARKED. A PLURALITY OF PAGES ARE OUPUTTED ONTO A DISPLAY OR TO A PRINTER.

· SEARCH ENGINE

HEYPERTEXT WITHOUT

FIG.17



IDEA ON I3 DOC

■PAPER HYPERTEXT

• MARKING AND INFORMATION FOR DIG

READ BY A SCANNER, A PAGE LINKED BY A BUTTON HAVING BEEN MARKED IS OUPUTTED ONTO A DISPLAY OR TO PRINTER AND WHEN A PLURALITY OF BUTTONS ARE MARKED, A PLURALITY OF PAGES ARE OUPUTTED ONTO A DISPLAY OR TO A PRINTER.

DB TEXT

• SEARCH

HEYPERTEX

DATA FOR RELATED INFORMATION [TITLE]

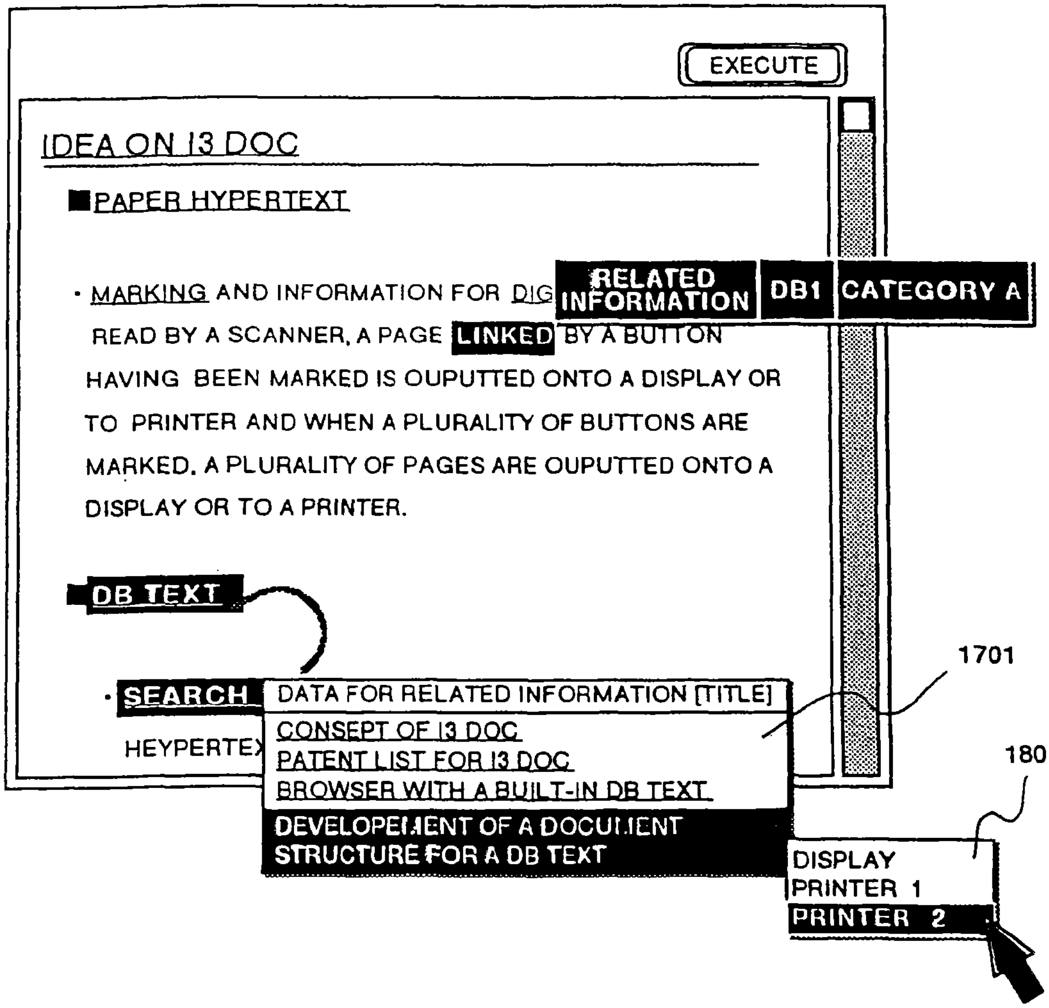
CONSEPT OF I3 DOC

PATENT LIST FOR I3 DOC

BROWSER WITH A BUILT-IN DB TEXT

DEVELOPEMENT OF A DOCUMENT STRUCTURE FOR A DB TEXT

FIG.18



• MARKING AND INFORMATION FOR DIG
READ BY A SCANNER, A PAGE LINKED BY A BUTTON HAVING BEEN MARKED IS OUPUTTED ONTO A DISPLAY OR TO PRINTER AND WHEN A PLURALITY OF BUTTONS ARE MARKED. A PLURALITY OF PAGES ARE OUPUTTED ONTO A DISPLAY OR TO A PRINTER.

DOCUMENT INFORMATION MANAGEMENT SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 11/400,229, filed Apr. 10, 2006, which is a continuation of co-pending U.S. application Ser. No. 10/668,973, filed Sep. 24, 2003, which is a continuation of U.S. application Ser. No. 10/126,588, filed Apr. 22, 2002, now U.S. Pat. No. 6,658,408, which is a continuation of U.S. application Ser. No. 09/305,473, filed May 6, 1999, now U.S. Pat. No. 6,381,593, and claims priority to Japanese Application Nos. 10-126515, filed May 8, 1998, and 10-231845, filed Aug. 18, 1998. The entire contents of the above-identified applications and patents are incorporated herein by reference.

FIELD OF THE INVENTION

The present invention relates to a document information management system enabling search of documents only by specifying an arbitrary word as a keyword in a hypertext or a non-hypertext document displayed on a screen.

BACKGROUND OF THE INVENTION

Conventionally, a form of a document commonly used in the world has generally been a paper document, but progress of the Internet or intranet has given a birth to a hypertext as an electronic document which can compete for the first time against the paper document. This hypertext document is a document written in HTML in a narrow sense, and includes all the electronic documents which can link between documents such as PDF documents by Adbe and a portion of an SGML document by CALS (namely, between a button comprising a particular word, a text, a symbol or graphics and a document) in a broad sense.

Specifically, the hypertext is a collection of linked texts (electronified documents) and is the basic concepts for multimedia software with which texts hierarchically related to each other can simultaneously be referred from multiple sites to in an arbitrary order through a link structure. Therefore, each document of this hypertext includes information for forming the link structure (namely, information as a hypertext) in addition to information visually provided to users.

By the way, in the field of computer technology, a search engine is provided as a means of searching for a document linked to a particular word (keyword) from vast number of undefined documents. It should be noted that in the conventional type of search engine a keyword is not entered in a document but it is entered in a particular dialog box.

However, although there are many advantages in the hypertext, a jump can be made only to a linked page (document), and so, when a user wants to have information related to any word not linked to some other documents, it is necessary to actuate a search engine or the like and perform a search (a keyword search or a global search), which makes the operation complicated, and also linkage among documents is not easy therefore it is not always easy to use the hypertext.

In the conventional type of hypertext, an operation with one button can be linked only to one document (page), which does not allow a plurality of documents to be referred to with one button. Especially, the Intranet documents are highly specialized so that there may exist a plurality of information that the user wants to refer to with one button, hence convenience of use and workability are not sufficient for the situation.

In the conventional type of search engine, a user interface is of inferior performance as compared to a hypertext and the operating method is also different, and so, insufficient workability and convenience are found in actuation of a search engine and performance of a search during operation of the hypertext. Especially, in a browser function for displaying and operating a hypertext on a screen, it is general to operate only with a pointing device such as a mouse, so that entry of a keyword into a dialog box of the search engine through a keyboard disturbs the flow of work.

SUMMARY OF THE INVENTION

It is an object of the present invention to get, for the purpose of solving the problems, enhanced convenience in document information management as well as in a document search, improved operability of a keyword search, and further promoted workability when a search is performed through a hypertext by performing a search (a keyword search and/or a global search) with any word which is not linked to other documents as a keyword through a clicking operation thereon and enabling jumping from the clicked word to a page as an object to be searched like that with a button in a hypertext.

In the document information management system according to the present invention, a search-engine-compatible interface unit makes a word in a document displayed on the screen to be specified, transfers the specified word to a search engine as a keyword to be used in the search engine, receives a search result from the search engine, and displays the search result on the screen. On the other hand, a browser-compatible interface unit performs a search by using the keyword transferred from a browser and transfers a search result to the browser. Thus, by performing a search (a keyword search and/or a global search) with a word which is not liked to any document as a keyword through a clicking operation on the word, and enabling jumping from the clicked word to a page as an object to be searched like that with a button of a hypertext, it is possible to improve convenience in document information management as well as in a document search.

In the document information management system according to another aspect of the present invention, a search-engine-compatible interface unit makes a word in a document displayed on the screen to be specified, actuates a search engine and make the engine perform a search with the specified word as a keyword to be used in the search engine, receives a search result from the search engine and displays the result on the screen. Thus, by performing a search with a word which is not liked to any document as a keyword through a clicking operation on the word, and enabling jumping from the clicked word to a page as an object to be searched like that with a button of a hypertext, it is possible to improve convenience in document information management as well as in a document search.

Other objects and features of this invention will become apparent from the following description with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a view showing a document information management system according to Embodiment 1 of the present invention represented in the claim;

FIG. **2** is an explanatory view showing a concrete example of hardware configuration of the document information management system according to Embodiment 1;

FIG. **3** is a schematic flowchart of the document information management system according to Embodiment 1;

FIG. **4** is an explanatory view showing a display example of a pop-up menu according to Embodiment 1;

FIG. **5** is a view showing a document information management system according to Embodiment 2 of the present invention represented in the claim;

FIG. **6** is a schematic flow chart of the document information management system according to Embodiment 2;

FIG. **7** is a schematic flow chart of a document information management system according to Embodiment 3;

FIG. **8** is an explanatory view showing a concrete example of processing in steps S**702** to S**705** of FIG. **7**;

FIG. **9** is an explanatory view showing a display example of a keyword according to Embodiment 3;

FIG. **10** is a schematic flow chart of a document information management system according to Embodiment 4;

FIG. **11**A and FIG. **11**B are explanatory views showing how a word is identified by a search-engine-compatible interface unit according to Embodiment 5;

FIG. **12** is a schematic flow chart of a document information management system according to Embodiment 6;

FIG. **13** is a schematic flow chart of a document information management system according to Embodiment 7;

FIG. **14** is an explanatory view showing an example of how to specify (identify) search criteria and output criteria through a mouse operation in Embodiment 7;

FIG. **15** is an explanatory view showing an example of how to specify (identify) search criteria and output criteria through a mouse operation in Embodiment 7;

FIG. **16** is an explanatory view showing an example of how to specify (identify) search criteria and output criteria through a mouse operation in Embodiment 7;

FIG. **17** is an explanatory view showing an example of how to specify (identify) search criteria and output criteria through a mouse operation in Embodiment 7; and

FIG. **18** is an explanatory view showing an example of how to specify (identify) search criteria and output criteria through a mouse operation in Embodiment 7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Detailed description is made hereinafter for the document information management system according to the present invention in the order of Embodiment 1 to Embodiment 7 with reference to the accompanied drawings.

The document information management system according to Embodiment 1 is a system for getting enhanced convenience in document information management as well as in a document search, improved operability of a search, and further promoted workability when a search is performed through a hypertext by using a document displayed on the screen of a browser as a front end of a search engine and displaying a search result by the search engine on the screen of the browser.

FIG. **1** shows the document information management system according to Embodiment 1 represented in the claim which comprises at least one database or a filing unit (described only as the database hereinafter to make description simpler) **101** for storing therein a plurality of document files comprising a hypertext document written in hypertext language such as HTML and/or a non-hypertext document prepared with an application such as word processor, a browser **102** having a browsing function for displaying and operating the hypertext document and the non-hypertext document on a screen, and a search engine **103** having a search-engine function of searching for a corresponding document through the database (or the filing unit) **101** according to a specified keyword.

It should be noted that the browser **102** has a search-engine-compatible interface unit **104** for specifying a word in a document displayed on the screen, transferring the specified word to the search engine **103** as a keyword to be used in the search engine **103**, receiving a search result from the search engine **103**, and displaying the search result on the screen. Herein, the browser **102** receives a list for a pop-up menu from the search engine **103** (browser-compatible interface unit **105**) as a search result by the search (keyword search or/and global search), and displays the pop-up menu in a space adjacent to the specified word.

The search engine **103** has a browser-compatible interface unit **105** for performing a search by using the keyword transferred from the browser **102** (to be precise search-engine-compatible interface unit **104**) and transferring a search result to the browser **102** (to be precise search-engine-compatible interface unit **104**). Herein, the search engine **103** prepares a list for a pop-up menu and transfers the list to the search-engine-compatible interface unit **104**.

FIG. **2** shows a concrete example of hardware configuration of the document information management system according to Embodiment 1, in which a plurality of Web servers **201** connected to a network such as the Intranet can be used as databases **101**. This Web server **201** has a large-capacity hard disk device for storing the documents (hypertext documents and non-hypertext documents) to be used in the system.

As the browser **102**, a terminal unit **202** such as a personal computer with built-in application software for realizing a browser function can be used. This terminal unit **202** has at least a display for displaying a document thereon, a pointing device such as a mouse for operating the screen, and a communication unit for carrying out communications through a network Net. Of course, the search-engine-compatible interface unit **104** is incorporated in the terminal unit **202** as one function of application software for realizing a browser function. A number of terminal units **202** is not particularly specified, and so it is needless to say that a plurality of terminal units **202** can be provided on the network Net as shown in the figure.

As the search engine **103**, a terminal unit **203** such as a personal computer with built-in application software for realizing a search engine function can be used. This terminal unit **203** is connected to the network Net, and a plurality of units may be provided. One terminal unit can also be shared for the terminal unit **202** as the browser **102** and the terminal unit **203** as the search engine **103**. More specifically, the application software for realizing the search engine function may be incorporated in the terminal unit **202** with the built-in application software for realizing the browser function. Of course, the browser-compatible interface unit **105** is incorporated in the terminal unit **203** (together with the search engine **103**) as one function of application software for realizing a browser function.

Description is made for the operation based on the configuration described above with reference to FIG. **3**. FIG. **3** shows a schematic flow chart of the document information management system according to Embodiment 1. In Embodiment 1, when a keyword is inputted through the browser **102**, the browser-compatible interface unit **105** actuates the search engine **103**, and a search with the keyword is started.

At first, the browser **102** displays a document on the screen (S**301**). The search-engine-compatible interface unit **104** starts its operation in this state.

When a word is identified (specified) through a mouse operation of the terminal unit **202** (S**302**), the search-engine-compatible interface unit **104** recognizes the word as a keyword (S**303**), transfers the keyword to the search engine **103** (S**304**), and displays the recognized keyword (S**305**). Identification (specification) of a word herein is performed, for example, by clicking the second mouse button in order to differentiate the above processing from processing of the hypertext document. The keyword is provided in a reverse video or is underlined so that it can be discriminated from other words.

On the other hand, when the browser-compatible interface unit **105** of the search engine **103** receives a keyword from the search-engine-compatible interface unit **104** of the browser **102** it actuates the search engine **103** and sets the keyword in a keyword-entry item of the search engine **103** (S**351**). Herein, the browser-compatible interface unit **105**, although it is a part of the application for the search engine **103**, always stays resident on the terminal unit **203** and also plays a role as a trigger to actuate the main system of the search engine **103** when the keyword is transferred from the search engine **103**.

When the keyword is set in step S**351**, the search engine **103** executes a search operation with the set keyword (S**352**). It should be noted that the search with the keyword in this case is performed based on the assumption that an object to be searched by the search engine **103** (the database **101** to be searched) is previously set and specified. Therefore, a search can be performed across all the databases **101** connected to the network Net as objects to be searched through setting or specification thereof, and can also be performed across only a particular database **101** as an object to be searched. Setting and specification of the database **101** as an object to be searched may be carried out with the browser **102** although it is not mentioned herein.

Then, the browser-compatible interface unit **105** prepares a list for a pop-up menu from a search result with the keyword (S**353**), and transfers the prepared list to the browser **102** (S**354**). It should be noted that document names having been searched and URLs (addresses) for those documents are described on the list.

When the search-engine-compatible interface unit **104** of the browser **102** receives a list from the browser-compatible interface unit **105** it develops the list to a hypertext and overwrites (displays) the list in a space adjacent to the keyword of the original document as a pop-up menu (S**306**). It should be noted that FIG. **4** shows a display example of a pop-up menu **402** appearing on the screen **401** of the browser **102**.

When the user identifies a desired document out of the pop-up menu as indicated by the cursor **403** in FIG. **4** through the mouse operation, the search-engine-compatible interface unit **104** notifies the URL (identification of the document) of the corresponding document described on the list to the browser **102** (S**307**). The browser **102** accesses the database **101** (Web server **201**) with a document in the linked address stored therein according to the URL, and requests the database **101** to transfer the source code of the corresponding document (S**308**).

The database **101** having received the request from the browser **102** to transfer the source code transfers the source code of the corresponding document to the browser **102** (S**391**).

The browser **102** after receiving the source code develops the code to a hypertext document or a non-hypertext document (application document), and displays either of the documents on the screen (S**309**).

In accordance with Embodiment 1 as described above, a search is performed by using a word which is not linked to other documents as a keyword by clicking on the word, and it is possible to jump from the clicked word to a page as an object to be searched, which is just like the operation with a button of a hypertext. Therefore, it is possible to enhance convenience in document information management as well as in a document search, improve operability of a keyword search, and further promote workability when a search is performed through a hypertext. In other words, it is possible to use a document displayed on the screen of a browser **102** as a front end of the search engine **103** and display a search result by the search engine **103** on the screen of the browser **102**.

It should be noted that the browser-compatible interface unit **105** can be realized by rewriting API (Application Programming Interface) of the existing search engine **103**. Also, a search-engine-compatible interface unit **104** of the browser **102** can be realized by being added to the existing browser as plug-in software.

The document information management system according to Embodiment 2 is an example having the same effect as that of Embodiment 1 in which the existing search engine **103** not having a browser-compatible interface unit **105** is used. Namely, in the document information management system according to Embodiment 1, the browser **102** has the search-engine-compatible interface unit **104** and the search engine **103** has the browser-compatible interface unit **105**, through which the document appearing on the screen of the browser **102** is usable as a front end of the search engine **103**, but in Embodiment 2, by expanding the function of the search-engine-compatible interface unit **104** of the browser **103**, the existing search engine **103** without a browser-compatible interface unit **105** incorporated therein can be used.

It should be noted that an example of basic hardware configuration is the same as that in Embodiment 1, so that description is made herein only for the different sections.

FIG. **5** shows a the document information management system according to Embodiment 2 represented in the claim which comprises at least one database or a filing unit (described only the database hereinafter to make description simpler) **101** for storing therein a plurality of document files comprising a hypertext document written in a hypertext language such as HTML and/or a non-hypertext document prepared with an application such as word processor, a browser **102** having a browsing function for displaying and operating the hypertext document and non-hypertext document on a screen, and a search engine **103** having a search-engine function of searching for a corresponding document through the database **101** according to a specified keyword.

It should be noted that the browser **102** has a search-engine-compatible interface unit **106** for specifying a word in a document displayed on the screen, actuating the search engine **103** to make the engine perform a search with the specified word as a keyword to be used in the search engine **103**, receiving a result of the search from the search engine **103**, and displaying the search result on the screen.

Description is made for the operation based on the configuration described above with reference to FIG. **6**. FIG. **6** shows a schematic flow chart of the document information management system according to Embodiment 2. In Embodiment 2, when receiving a keyword, the browser **102** actuates the search engine **103**, and a search with the keyword is started.

At first, the browser **102** displays a document on the screen (S**601**). The search-engine-compatible interface unit **106** starts its operation in this state.

When a word is identified (specified) through a mouse operation of the terminal unit **202** (S**602**), the search-engine-compatible interface unit **106** recognizes the word as a keyword (S**603**), and actuates the search engine **103** (S**604**). Herein, the actuated search engine **103** transfers a screen for entering a keyword to the search-engine-compatible interface unit **106** as processing executable on the system (S**651**).

Even if the search-engine-compatible interface unit **106** receives the keyword entering screen from the search engine **103** it does not display this screen (namely, the processing of displaying the screen is skipped), but transfers the keyword recognized in step S**603** to the search engine **103** (S**605**), and displays the recognized keyword on the screen (S**606**). Identification (specification) of a word herein is performed, for example, by clicking the second mouse button in order to differentiate the above processing from processing of the hypertext document. The keyword is provided in a reverse video or is underlined so that it can be discriminated from other words.

On the other hand, when the search engine **103** receives a keyword from the search-engine-compatible interface unit **106** it performs the processing of a search with the received keyword (S**652**). It should be noted that the search with the keyword in this case is performed based on the assumption that an object to be searched by the search engine **103** (the database **101**) is previously set and specified. Therefore, a search can be performed across all the databases **101** connected to the network Net as objects to be searched through setting or specification thereof, and can also be performed across only a particular database **101** as an object to be searched. Setting and specification of the database **101** as an object to be searched may be carried out with the browser **102** although it is not mentioned herein.

Then the search engine **103** transfers a result of the search to the search-engine-compatible interface unit **106** (S**653**).

While the search-engine-compatible interface unit **106** cuts out, when receiving the keyword-search result, the button from the search result to prepare a list for a pop-up menu (S**607**), develops the list to a hypertext, and overwrites (displays) the list in a space adjacent to the keyword of the original document as a pop-up menu (S**608**).

When the user identifies a desired document out of the pop-up menu through the mouse operation, the search-engine-compatible interface unit **106** notifies the URL (identification of the document) of the corresponding document described on the list to the browser **102** (S**609**). The browser **102** accesses the database **101** (Web server **201**) with a document in the linked address stored therein according to the URL, and requests the database **101** to transfer the source code of the corresponding document (S**610**).

The database **101** having received the request from the browser **102** to transfer the source code transfers the source code of the corresponding document to the browser **102** (S**691**).

When the browser **102** receives the source code it develops the code to a hypertext document or a non-hypertext document (application document), and displays either of the documents on the screen (S**611**).

In accordance with Embodiment 2 as described above, in addition to the same effect as that in Embodiment 1, the existing search engine **103** can be used as it is, which makes it easy to apply the invention to the existing system, and the convenience of use can further be improved.

In the document information management system according to Embodiment 3, a document file for a document displayed on the screen and used for specifying a keyword by the browser has a word table prepared by previously cutting out words included in the document file. The search-engine-compatible interface unit selects in the document displayed on the screen a plurality of expanded character strings each obtained by adding characters or character strings before and behind a character pointed by a cursor thereto, compares the selected strings to the words in the word table added to the document to evaluate the strings, and identifies an optimal word which can be assumed as the one being pointed by the cursor as a keyword to be used in the search engine.

The document information management system according to the present invention requires a function of identifying a word specified in the browser (search-engine-compatible interface unit), but this function of identifying a word can be realized in various methods, so that, a method is not particularly defined in Embodiment 1 and Embodiment 2. Therefore, in Embodiment 3, the function of identifying a word preferable to the document information management system is explained concretely.

It should be noted that the basic configuration and the operation thereof are the same as those in Embodiment 1, so that detailed description is made herein only for the different sections.

By the way, it is not easy to identify a word in a document such as the one written in Japanese. In such a case the method of identifying a word includes a method of preparing a particular document structure previously produced according to a use and a method of using an existing document structure. Herein, the document structure for the browser **102** of the document information management system according to the present invention makes it easy to identify a word by using a document (a hypertext document or a non-hypertext document) having a word table prepared by previously cutting out words included in a document file.

Added to a document file handled in the document information management system according to Embodiment 3 is a word table prepared by previously cutting out words in a document file. When a global search is to be performed across any document in Japanese, Chinese, or Korean language as an object to be searched, an index file such as a character element table and a word table is added to the document to be searched. Therefore, all of the documents handled in the system has a word table added thereto respectively, and this word table functions as a word table used for identifying a word in the document on the screen of the browser **102** and functions as an index file used for a global search in the document to be searched.

The preparation of the word table will be carried out as follows with terminal units **202**, **203** and a Web server **201** connected to the network Net.

At first, words are cut out of a document registered anew by using a technique such as morpheme analysis at the point of time when a prepared document is registered or during the time zone such as night time when the document information management system is not used, then, a word table is prepared with the cut-out words, and the word table is added to the original document file, and the rewritten data is registered.

The processing as described above is always carried out, which allows word tables to be added to all the document files existing in the document information management system according to Embodiment 3.

Description is made for the operation based on the configuration described above with reference to FIG. **7**. FIG. **7** shows a schematic flow chart of the document information management system according to Embodiment 3. In Embodiment 3, when a keyword is identified by the browser **102**, the browser-compatible interface unit **105** actuates the search engine **103**, and a search with the keyword is started.

At first, the browser **102** displays a document on the screen (S**701**). The search-engine-compatible interface unit **104** starts its operation in this state.

When a character is identified (specified) through a mouse operation of the terminal unit **202** (S**702**), the search-engine-compatible interface unit **104** cuts out a character string obtained by adding some characters before and after the character thereto (adjacent character string) (S**703**), compares the cut-out character string to the word table (S**704**), cuts out the character string coincident with any word in the word table as a word, and identifies the word (S**705**).

Herein, a concrete example of processing in steps S**702** to S**705** is shown with reference to FIG. **8**. As shown in FIG. **8**, for example, a cursor **801** is moved to an arbitrary character (herein a character "A" in the word "MARKED") in the document displayed on the screen, a mouse button is clicked, and the character (character "A") at the position of the cursor is specified. The character at the position of the cursor specified as described above is identified as an identified character **702**A in step S**702** (Refer to FIG. **7**). It should be noted that identification of a word herein is performed, for example, by clicking the second mouse button in order to differentiate the above processing from processing of the hypertext document.

Then, a character string obtained by adding some characters before and after the identified character thereto (adjacent character string) is cut out. It is conceivable that there are various methods as the method of cutting out a character, but there is the simplest one in which punctuation marks before and after an identified character are decided as identifiers and a character string between the punctuation marks can be cut out as an adjacent character string. In this case, the adjacent character string cut-out in step S**703** is as follows: "when a plurality of buttons are marked a plurality of pages are outputted onto the display or to the printer." as indicated by the reference numeral **703**A in FIG. **7**.

Then, the adjacent character string is compared with the words in the word table, and the character string coincident with any word in the word table is cut out as a word, and the word is identified. This identification of a word can be carried out as follows.

1) A character string "MA" obtained by adding one character before the specified character "A" is decided as a temporary word, and comparison is made as to whether there is any word coinciding with this temporary word in the word table or not, and when it is determined that there is a coinciding word in the word table, the temporary word is identified as a word.

2) When it is determined that there is no coinciding word in the word table, a character string "AR" obtained by adding one character behind the specified character "A" is decided as a temporary word, and comparison is made as to whether there is any word coinciding with this temporary word in the word table or not, and when it is determined that there is the coinciding word, the temporary word is identified as a word.

3) When it is determined that there is no coinciding word therein, a character string "MAR" obtained by adding one character before and after the specified character "A" is decided as a temporary word, and comparison is made as to whether there is any word coinciding with this temporary word in the word table or not, and when it is determined that there is the coincident word therein, the temporary word is identified as a word.

Thereafter and on, characters are added in the same manner as described above, and the processing is repeated until the cut-out character string is coincident with any word in the word table or until 'the cut-out character string' becomes the same as 'the adjacent character string'.

Herein, a word "MARK" is identified as indicated by the reference numeral **705**A in FIG. **7** during the identification of a word in step S**705**.

In English language the words in a sentence are separated by a space, so that a character string sandwiched between spaces can without difficulty be considered as a word. However, in languages like Japanese, Chinese or Korean, words in a sentence are not separated by space as in English. Therefore, in the documents written in these languages, it is difficult to decide where a word starts and where it ends in a sentence. In the above described method, a character is added before or behind a specified character, so that, a stage is reached when a word having a meaning is formed and the word coincides with a word in the word table. Though an English language document is shown in FIG. **8** for simplification in explanation, this method is more effective for extracting a word from the documents written in Japanese, Chinese or Korean languages.

The identified word "MARK" is recognized as a keyword in step S**706** of FIG. **7**, and the keyword is transferred to the search engine **103**. The recognized keyword is also displayed on the screen in step S**707**. FIG. **9** shows an example of display of a keyword. The keyword is provided in a reverse video or is underlined so that it can be distinguished from other words.

On the other hand, when the browser-compatible interface unit **105** of the search engine **103** receives the keyword from the search-engine-compatible interface unit **104** of the browser **102** it actuates the search engine **103** and sets the keyword in a keyword-entry item of the search engine **103** (S**751**). Herein, the browser-compatible interface unit **105**, although it is a part of the application for the search engine **103**, always stays resident on the terminal unit **203** and also plays a role as a trigger to actuate the main system of the search engine **103** when the keyword is transferred from the search engine **103**.

When the keyword is set in step S**751**, the search engine **103** executes a search operation with the set keyword (S**752**).

Then, the browser-compatible interface unit **105** prepares a list for a pop-up menu from a search result with the keyword (S**753**), and transfers the prepared list to the browser **102** (S**754**). It should be noted that document names having been searched and URLs (addresses) for those documents are described in this list.

When the search-engine-compatible interface unit **104** of the browser **102** receives a list from the browser-compatible interface unit **105** it develops the list to a hypertext and overwrites (displays) the list in a space adjacent to the keyword of the original document as a pop-up menu (S**708**).

When the user identifies a desired document out of the pop-up menu through the mouse operation, the search-engine-compatible interface unit **104** notifies the URL (identification of the document) of the corresponding document described in the list to the browser **102** (S**709**). The browser **102** accesses the database **101** (Web server **201**) with a document in the linked address stored therein according to the URL, and requests the database **101** to transfer the source code of the corresponding document (S**710**).

The database **101** having received the request from the browser **102** to transfer the source code transfers the source code of the corresponding document to the browser **102** (S**791**).

When the browser **102** receives the source code it develops the code to a hypertext document or a non-hypertext document (application document), and displays either of the documents on the screen (S**711**).

In accordance with Embodiment 3 as described above, in addition to the same effect as that in Embodiment 1, a document file has a word table prepared by previously cutting out words included in the document file, and the search-engine-compatible interface unit selects, in the document displayed on the screen, a plurality of expanded character strings each obtained by adding characters or character strings before and after a character pointed by a cursor thereto, compares the selected strings to the words in the word table to evaluate the strings, and identifies an optimal word which can be assumed as the one being pointed by the cursor as a keyword to be used in the search engine, therefore a word as a keyword can accurately and efficiently be identified.

The document information management system according to Embodiment 4 concretely shows another example of a function for identifying a word preferable to the document information management system according to the present invention. It should be noted that the basic configuration and the operation thereof are the same as those in Embodiment 1, so that detailed description is made herein only for the different sections.

In the document information management system according to Embodiment 4, a hypertext document handled in the system has a dummy button obtained by previously cutting out a word included in the document and setting a target for linking the word thereto as particular address information for responding to actuation of the search engine provided therein. Further, the search-engine-compatible interface unit identifies, when the dummy button is pointed by the cursor, a word corresponding to the dummy button as a keyword to be used in the search engine, and also actuates the search engine according to the URL for the dummy button.

Thus, the hypertext document handled in Embodiment 4 has a previously set dummy button. It should be noted that any word having been set as an ordinary button in a hypertext document is not set as a dummy button, but all the main words other than the button therein are set as dummy buttons. A linked URL of this dummy button is set in the search engine **103** or in a common particular URL.

The setting and preparation of this dummy button is carried out as follows with terminal units **202**, **203** and the Web server **201** connected to a network Net. At first, a word is cut out of a document registered anew by using a technique such as morpheme analysis at the point of time when a prepared document is registered or during the time zone such as night time when the document information management system is not used, then, the cut-out word is identified as a dummy button, the linked URL thereof is set, the dummy button is added to the original document file, and the rewritten data is registered.

The processing as described above is always carried out, which allows dummy buttons to be added to all the hypertext documents existing in the document information management system according to Embodiment 4.

Description is made for the operation based on the configuration described above with reference to FIG. **10**. FIG. **10** shows a schematic flow chart of the document information management system according to Embodiment 4. In Embodiment 4, when a dummy button is identified by the browser **102**, the browser-compatible interface unit **105** actuates the search engine **103**, and a search with the keyword is started.

At first, the browser **102** displays a document on the screen (S**1001**). The search-engine-compatible interface unit **104** starts its operation in this state.

When a dummy button is identified (specified) through a mouse operation of the terminal unit **202** (S**1002**), the search-engine-compatible interface unit **104** accesses to the linked URL set in the dummy button (S**1003**), transfers the character string (word) for the dummy button to the linked location as a keyword (S**1004**), and displays the identified dummy button (keyword) on the screen (S**1005**). It should be noted that a keyword is provided in a reverse video or is underlined so that it can be distinguished from the button and other words in a hypertext.

On the other hand, when the access is made from the search-engine-compatible interface unit **104** of the browser **102** in step S**1003**, the browser-compatible interface unit **105** of the search engine **103** actuates the search engine **103** (S**1051**), recognizes the keyword when it receives the keyword from the search-engine-compatible interface unit **104** in step S**1004** and sets the keyword in a keyword-entry item of the search engine **103** (S**1052**). Herein, the browser-compatible interface unit **105**, although it is a part of the application for the search engine **103**, always stays resident on the terminal unit **203** and also plays a role as a trigger to actuate the main system of the search engine **103** when the keyword is transferred from the search engine **103**.

When the keyword is set in step S**1052**, the search engine **103** executes a search operation with the set keyword (S**1053**).

Then, the browser-compatible interface unit **105** prepares a list for a pop-up menu from a search result with the keyword (S**1054**), and transfers the prepared list to the browser **102** (S**1055**). It should be noted that document names having been searched and URLs (addresses) for those documents are described in this list.

When the search-engine-compatible interface unit **104** of the browser **102** receives a list from the browser-compatible interface unit **105** it develops the list to a hypertext and overwrites (displays) the list in a space adjacent to the keyword of the original document as a pop-up menu (S**1006**).

When the user identifies a desired document out of the pop-up menu through the mouse operation, the search-engine-compatible interface unit **104** notifies the URL (identification of the document) of the corresponding document described in the list to the browser **102** (S**1007**). The browser **102** accesses the database **101** (Web server **201**) with a document in the linked address stored therein according to the URL, and requests the database to transfer the source code of the corresponding document (S**1008**).

The database **101** having received the request from the browser **102** to transfer the source code transfers the source code of the corresponding document to the browser **102** (S**1091**).

When the browser **102** receives the source code it develops the code to a hypertext document or a non-hypertext document (application document), and displays either of the documents on the screen (S**1009**).

In accordance with Embodiment 4 as described above, in addition to the same effect as that in Embodiment 1, a hypertext document has a dummy button obtained by previously cutting out a word included in the document and setting the linked address of the word as particular address information (URL) for responding to actuation of the search engine, therefore a word as a keyword can efficiently be identified and also a search engine can easily be actuated.

Embodiment 5 shows another example of a function for identifying a word preferable to the document information management system according to the present invention, and a search engine-compatible interface unit cuts out, in a document displayed on the screen, a character string from a header character to an end character indicated by the cursor as a word, and identifies the cut-out word as a keyword to be used in the search engine. It should be noted that the basic configuration and the operation thereof are the same as those in Embodiment 1, so that description is made herein only for a method of identifying a word by the search-engine-compatible interface unit **104**.

FIG. **11**A and FIG. **11**B are explanatory views showing how a word is identified by the search-engine-compatible interface unit **104** according to Embodiment 5. The search-engine-compatible interface unit **104** detects, as shown in FIGS. **11**A and **11**B, a first position **1101** and a second position **1102** of the cursor in the document on the screen of the browser **102**, cuts out a character string from the character at the first position **1101** to the character at the second position **1102** as a specified word, and sets the word as an identified word **1103**.

More specifically, a method of clicking ON a mouse button at the first position **1101** and clicking OFF the mouse button at the second position **1102** and a method of clicking the mouse button at the first position **1101** and again clicking the mouse button at the second position **1102** may be used. Also identification of a word is performed, for example, by clicking the second mouse button in order to differentiate the above processing from processing of the hypertext document. Further, the identified word is provided in a reverse video or is underlined.

In accordance with Embodiment 5 as described above, there is no need to have a particular document structure, therefore an existing hypertext document or a non-hypertext document (application document) can be used as it is. In addition, a word as a keyword can efficiently be identified.

In the document information management system according to Embodiment 6, the search-engine-compatible interface unit cuts out, in the document displayed on the screen, an optimal word through evaluation of an expanded character string obtained by adding characters or character strings before and behind a character pointed by a cursor thereto by using a word cut-out technique such as morpheme analysis, and identifies the cut-out word as a keyword to be used in the search engine.

It should be noted that the basic configuration and the operation thereof are the same as the document information management system according to Embodiment 3, so that description is made herein only for the different sections.

FIG. **12** shows a schematic flow chart of the document information management system according to Embodiment 6, in which step S**1201** is provided in place of step S**704** of the schematic flow chart in Embodiment 3 shown in FIG. **7**, and the other steps are the same as those in Embodiment 3.

When a character is identified (specified) through a mouse operation of the terminal unit **202** (S**702**), the search-engine-compatible interface unit **104** cuts out a character string obtained by adding some characters before and after the character thereto (adjacent character string) (S**703**), cuts out a word through morpheme analysis of the cut-out character string for evaluation (S**1201**), and identifies an optimal word (S**705**).

Herein, the adjacent character string cut-out in step S**703** is as follows: "when a plurality of buttons are marked, a plurality of pages are outputted onto the display or to the printer." as indicated by the reference numeral **703**A in FIG. **12**. When this adjacent character string is subjected to the morpheme analysis, the word "MARK" can be identified as indicated by the reference numeral **705**A in FIG. **12**.

In accordance with Embodiment 5 as described above, the search-engine-compatible interface unit **104** cuts out an optimal word through evaluation of a character string by using a word cut-out technique such as morpheme analysis, and identifies the cut-out word as a keyword to be used in the search engine, therefore a word as a keyword can accurately and efficiently be identified.

The document information management system according to Embodiment 7 enables entry of search criteria and output criteria much more as compared to those in Embodiment 1 to Embodiment 6. It should be noted that the basic configuration is the same as that of Embodiment 1, so that description is made herein only for the different sections.

In the document information management system according to Embodiment 7, the search-engine-compatible interface unit **104** displays a menu for specifying search criteria and output criteria for the search engine **103** in a space adjacent to the specified word, and performs a search and output according to the specified word as well as to the menu items specified by the cursor.

Description is made for the operation based on the configuration described above with reference to FIG. **13**. FIG. **13** shows a schematic flow chart of the document information management system according to Embodiment 7. In Embodiment 7, when a keyword is identified by the browser **102**, the browser-compatible interface unit **105** actuates the search engine **103**, and a search with the keyword is started.

At first, the browser **102** displays a document on the screen (S**1301**). The search-engine-compatible interface unit **104** starts its operation in this state.

When a word is identified (specified) through a mouse operation of the terminal unit **202** (S**1302**), the search-engine-compatible interface unit **104** recognizes, the word as a keyword (S**1303**), and displays the recognized keyword on the screen (S**1304**).

Then, a pop-up menu for specifying search criteria as well as output criteria is overwritten and displayed adjacent to the recognized keyword (S**1305**). More specifically, as shown in FIG. **14**, when the keyword **1401** (for example, "LINKED") is displayed, the pop-up menu for the search criteria as well as output criteria is displayed adjacent to the corresponding keyword. By clicking on a desired character on this pop-up menu (not shown), the corresponding item can be selected. In the search criteria, it is possible to specify a category and a type of DB (database to be searched), and in the output criteria, it is possible to specify output of related information and data for the related information and also specify a target to be outputted of data (a device to which the data is outputted).

When the search criteria and output criteria are identified through the mouse operation described later in step S**1306**, the search-engine-compatible interface unit **104** transfers the recognized keyword and the identified search criteria to the search engine **103** (S**1307**).

On the other hand, when the browser-compatible interface unit **105** of the search engine **103** receives a keyword from the search-engine-compatible interface unit **104** of the browser **102** it actuates the search engine **103** and sets the keyword for the search engine **103** and the search criteria as well as output criteria therein (S**1351**). Herein, the browser-compatible interface unit **105**, although it is a part of the application for the search engine **103**, always stays resident on the terminal unit **203** and also plays a role as a trigger to actuate the main system of the search engine **103** when the keyword is transferred from the search engine **103**.

When the keyword and the search criteria as well as output criteria are set in step S**1351**, the search engine **103** executes a search operation with the set keyword and search criteria as well as output criteria (S**1352**).

Then, the browser-compatible interface unit **105** determines whether output of data for related information is specified as an output criterion or not (S**1353**). Herein, when it is determined that the output of data for related information is set, the browser-compatible interface unit **105** prepares a list for a pop-up menu from a keyword-search result (S**1355**), and transfers the prepared list to the browser **102** (S**1356**). When it is determined that the output of data for related information is not set, the browser-compatible interface unit **105** transfers only the URL for the related information to the browser **102** (S**1354**).

When the search-engine-compatible interface unit **104** of the browser **102** receives a list from the browser-compatible interface unit **105** it develops the list to a hypertext and overwrites (displays) the list in a space adjacent to the keyword of the original document as a pop-up menu (S**1308**).

When the user identifies a desired document out of the pop-up menu through the mouse operation, the search-engine-compatible interface unit **104** notifies the URL (identification of the document) of the corresponding document described in the list to the browser **102** (S**1309**). The browser **102** accesses the database **101** (Web server **201**) with a document in the linked address stored therein according to the URL, and requests the database **101** to transfer the source code of the corresponding document (S**1310**). Similarly, when the browser **102** receives the URL for the related information from the browser-compatible interface unit **105** it accesses the database **101** (Web server **201**) with a document in the linked address stored there in according to the URL, and requests the database **101** to transfer the source code of the corresponding document.

The database **101** having received the request from the browser **102** to transfer the source code transfers the source code of the corresponding document to the browser **102** (S**1391**).

When the browser **102** receives the source code it develops the code to a hypertext document or a non-hypertext document (application document), and displays either of the documents on the screen (S**1311**).

Next, description is made more specifically for a method of specifying (identifying) search criteria as well as output criteria through a mouse operation with reference to FIG. **14** to FIG. **18**.

Specification of the search criteria as well as output criteria is performed, for example, by clicking the second mouse button in order to differentiate the above processing from processing of the hypertext document. The specified word is provided in a reverse video or is underlined.

As the search criteria, a simple search equation can be used. For example, OR search does not require a search equation while an AND search is performed through the operation described below. At first, it is assumed, as shown in FIG. **14**, that the criteria indicated by the pop-up menu **1402** are set for the keyword **1401** and the criteria (default) indicated by the pop-up menu **1404** are set for the keyword **1403**. In this status, the cursor is pointed to the keyword **1403** having been specified and the second mouse button is clicked ON, and the cursor is moved to the keyword **1405** which is not specified yet and the second mouse button is clicked OFF, and then an AND sign "∩" is generated over the keyword **1403** to the keyword **1405**. At this point of time, the same contents as those of the pop-up menu **1404** are displayed as a pop-up menu **1406**. It should be noted that only the pop-up menu **1404** may be displayed for the AND search.

As some other method, the cursor is pointed to the keyword **1403** having been specified and the second mouse button is clicked ON, and the cursor is moved to the keyword **1405** which is not specified yet and the second mouse button is clicked OFF, and then the keyword **1403** is moved to the position of the keyword **1405** and automatically returned to the original position as soon as the second mouse button is clicked OFF (drag & drop), and the AND sign "∩" is generated over the keyword **1403** to the keyword **1405**. At this point of time, the same contents as those of the pop-up menu **1404** are displayed as the pop-up menu **1406**.

Some other search criteria as well as output criteria are also specified by clicking thereon. For example, as shown in FIG. **15**, "Related information, DB2, Category C, Display" is specified in the pop-up menu **1404** of the AND search for the keyword **1403** and keyword **1405**. This specification indicates "AND of the two keywords is searched in the category C of the DB2, and the data for related information is outputted to the display (during its specification)". The specified search criteria as well as output criteria is displayed like the pop-up menu **1402** for the keyword **1401**. It should be noted that the pop-up menu **1402** indicates "One keyword is searched in the category A of the database DB1, and the related information is outputted to the printer 1 (after its specification)".

When the contents of a pop-up menu (search criteria and output criteria) having been specified once is to be corrected, the cursor is pointed to the pop-up menu having been specified and the second mouse button is clicked, and then the pop-up menu is displayed again, on which specification can be carried out again.

Then, as shown in FIG. **16**, when the cursor is pointed to the "EXECUTE" button **1601** on the screen and the second mouse button is clicked, execution of a search is instructed, and the criteria therefor are identified in step S**1306** of FIG. **13**.

FIG. **17** shows an example of how the mouse is operated when a target to be outputted of data for related information is to be specified. As shown in steps S**1355**, S**1356** of FIG. **13**, the browser-compatible interface unit **105** of the search engine **103** transfers a search result as a list for a pop-up menu to the search-engine-compatible interface unit **104** of the browser **102**. The search-engine-compatible interface unit **104** develops the list to a hypertext, and overwrites and displays the list in a space adjacent to the original keyword as a pop-up menu **1701**. The data for related information (such as a title and summary) is displayed in some space adjacent to the keyword as the pop-up menu **1701** as described above, and when the cursor is pointed to a desired data for related information on the pop-up menu **1701** and the second mouse button is clicked thereon, a pop-up menu **1801** for output criteria is displayed as shown in FIG. **18**. A target to be outputted (printer 2 herein) of data can be specified by pointing the cursor to an item for the output criteria and clicking the second mouse button thereon.

It should be noted that the search criteria and output criteria shown in FIG. **14** to FIG. **18** are set as required, therefore items are not limited to the items described above. It is not always necessary to use all the items described above. Namely, only items required for each document information management system discretely constructed may be used.

In accordance with Embodiment 5 as described above, in addition to the same effect as that in Embodiment 1, the search-engine-compatible interface unit displays a menu for specifying search criteria and output criteria for the search engine in a space adjacent to a specified word, and performs a search and output according to the specified word as well as to the menu items specified by the cursor, so that workability and convenience for the user can further be improved.

As described above, in the document information management system according to the present invention, the search-engine-compatible interface unit makes a word in a document displayed on the screen to be specified, transfers the specified word to a search engine as a keyword to be used in the search engine, receives a search result from the search engine, and displays the search result on the screen, and the browser-compatible interface unit performs a search by using the keyword transferred from a browser and transfers a search result to the browser, so that, by performing a search (a keyword search and/or a global search) with a word which is not liked to any document as a keyword through a clicking operation on the word, and enabling jumping from the clicked word to a page as an object to be searched like that with a button of a hypertext, it is possible to improve convenience in document information management as well as in a document search, operability of a keyword search, and further workability when a search is performed through a hypertext.

In the document information management system according to another aspect of the present invention, a list for a pop-up menu is prepared from a keyword-search result and the pop-up menu is displayed on the screen, so that workability and convenience for the user can further be improved.

In the document information management system according to another aspect of the present invention, a search-engine-compatible interface unit makes a word in a document displayed on the screen to be specified, actuates a search engine and make the engine perform a search with the specified word as a keyword to be used in the search engine, receives a search result from the search engine and displays the result on the screen, so that, by performing a search with a word which is not liked to any document as a keyword through a clicking operation on the word, and enabling jumping from the clicked word to a page as an object to be searched like that with a button of a hypertext, it is possible to improve convenience in document information management as well as in a document search, operability of a keyword search, and further workability when a search is performed through a hypertext.

In the document information management system according to another aspect of the present invention, a document file has a word table prepared by previously cutting out words included in the document file, so that a word as a keyword can efficiently be identified.

In the document information management system according to another aspect of the present invention, a hypertext document has a dummy button obtained by previously cutting out a word included in the document and setting a linked target of the word as a particular address information for responding to actuation of the search engine, so that a word as a keyword can efficiently be identified and also a search engine can easily be actuated.

In the document information management system according to another aspect of the present invention, a search-engine-compatible interface unit cuts out, in the document displayed on the screen, a character string from a header character to an end character pointed by a cursor as a word, and identifies the cut-out word as a keyword to be used in the search engine, so that a word as a keyword can efficiently be identified.

In the document information management system according to another aspect of the present invention, a search-engine-compatible interface unit evaluates, in the document displayed on the screen, an expanded character string

obtained by adding characters or character strings before and after a character pointed by a cursor thereto based on a word cut-out technology such as morpheme analysis, cuts out an optimal word, and identifies the cut-out word as a keyword to be used in the search engine, so that a word as a keyword can accurately and efficiently be identified.

In the document information management system according to another aspect of the present invention, a document file has a word table prepared by previously cutting out words included in the document file, and a search-engine-compatible interface unit selects, in the document displayed on the screen, a plurality of expanded character strings each obtained by adding characters or character strings before and behind a character pointed by a cursor thereto, compares the selected strings to the words in the word table to evaluate the strings, and identifies an optimal word as if the word is pointed by the cursor as a keyword to be used in the search engine, so that a word as a keyword can accurately and efficiently be identified.

In the document information management system according to another aspect of the present invention, a hypertext document has a dummy button obtained by previously evaluating a word included in the document based on a word cut-out technology such as morpheme analysis, cutting out the word, and setting a linked target of the word as a particular URL for responding to actuation of a search engine, and a search-engine-compatible interface unit identifies, when the dummy button is pointed by the cursor, a word corresponding to the dummy button as a keyword to be used in the search engine, and also actuates the search engine according to the URL for the dummy button, so that a word as a keyword can accurately and efficiently be identified, and also a search engine can easily be actuated.

In the document information management system according to another aspect of the present invention, a search-engine-compatible interface unit displays a menu for specifying search criteria and output criteria for a search engine in a space adjacent to a specified word, and performs a search and output according to the specified word as well as to the menu items specified by the cursor, so that workability and convenience for the user can further be improved.

In the document information management system according to another aspect of the present invention, databases or the filing units are Web servers connected to each other through the Internet or an intranet, so that information can be collected from a wide range thereof through the Internet or the intranet.

Although the invention has been described with respect to a specific embodiment for a complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modifications and alternative constructions that may occur to one skilled in the art which fairly fall within the basic teaching herein set forth.

What is claimed is:

1. A search support system that is connectable to a user terminal through a network and supports a search when the user terminal causes a search engine to search a large indefinite number of documents on the network, the search support system comprising:

a processing circuit configured to prepare a dummy button in which designation information designating a particular search engine and a search key to be used in the particular search engine are set, so that the search key is transmitted to the particular search engine, and the particular search engine is caused to perform a search, and to add the prepared dummy button to a predetermined document prior to performing the search using the search key;

a memory to store therein the document to which the dummy button is added; and

a transmitter to transmit the document to the user terminal by retrieving the document from the memory in response to a transmission request from the user terminal.

2. The search support system according to claim **1**, wherein the processing circuit is further configured to prepare a plurality of dummy buttons in which common designation information is set, and to add the prepared dummy buttons to the predetermined document.

3. The search support system according to claim **1**, wherein the processor is further configured to prepare the dummy button in which a uniform resource locator (URL) of the search engine is set as the designation information.

4. A method performed by a search support system that is connectable to a user terminal through a network and supports a search when the user terminal causes a search engine to search a large indefinite number of documents on the network, the search support method comprising:

preparing a dummy button in which designation information designating a particular search engine and a search key to be used in the particular search engine are set prior to performing the search using the search key, so that the search key is transmitted to the particular search engine, and the particular search engine is caused to perform a search;

adding the prepared dummy button to a predetermined document;

storing, in a memory, the document to which the dummy button is added; and

transmitting the document to the user terminal by retrieving the document from the memory in response to a transmission request from the user terminal.

5. A non-transitory computer-readable medium storing program instructions that, when executed by a processing circuit that is connectable to a user terminal through a network and supports a search when the user terminal causes a search engine to search a large indefinite number of documents on the network, causes the processing circuit to perform a method, comprising:

preparing a dummy button in which designation information designating a particular search engine and a search key to be used in the particular search engine are set prior to performing the search using the search key, so that the search key is transmitted to the particular search engine, and the particular search engine is caused to perform a search;

adding the prepared dummy button to a predetermined document;

storing, in a memory, the document to which the dummy button is added; and

transmitting the document to the user terminal by retrieving the document from the memory in response to a transmission request from the user terminal.

* * * * *